

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Thompson's Pulverizing and Sifting Mill.

One of the novelties in machinery exhibited during the recent Kilburn Show was Thompson's Centrifugal Pulverizing and Sifting Mill, manufactured by the Pulsometer Engineering Company, of London. The Engineer gives the following description of the apparatus:

The accompanying engraving of the comminutor, as it has been named by the manufacturers, shows the arrangement of the mill exhibited, the periphery of which is 20 inches in diameter, but a smaller mill, 10 inches in diameter, was also shown and in motion. In our illustration A is a chilled iron ball 5 inches in diameter, driven by two drivers or disks, B B, which are placed on a spindle C, and are set up by nuts and india-rubber washers, so as to give an elastic grip in the ball. The disks B B are bell-mouthed, having bevel driving faces D D, and fan blades E E. The ball A is confined within an annular chilled iron path F F, 20 inches in diameter, which is provided with the hopper G. This path or ring is carried in a suspension frame H, which has two hollow-necked trunnions through which the spindle C passes. A wheel I, having placed within its rim the elevator buckets K K, revolves on one of the trunnions of H. An external hopper L, which is shaken from the end of the spindle, delivers into these buckets through the arms of the wheel I. An internal geared spur wheel M is placed on the trunnion of H, opposite the elevator wheel between the two wheels, which are stayed together. Surrounding the mill is placed a revolving cylindrical sieve N of any desired mesh, which is provided with a longitudinal elevator bucket O, the width of the sieve.

The driving pulleys P P are placed on the end of the spindle, and from the spindle motion is communicated by the small pulleys Q, R, S, T and the pinion W to the spur wheel M. The mill is carried on a cast-iron box standard, V V, and is covered in by a wood and iron casing, W. The mode of working is as follows: The spindle, when rotating, carries with it the disk and the ball, for, though the disks cannot hold the ball when still, they tend to assume a position normal to their axis directly they revolve, and they then pinch the ball more or less and carry it with them. The material to be pulverized is placed in the exterior hopper, whence it drops into the annular elevator and is discharged into the internal hopper. The substance, falling thence into the mill through double apertures, is first crushed by the rapid blows of the ball, which freely exerts its centrifugal or tangential force upon the substance under treatment, and by means of a simple rolling motion, kept up by the elastic-pressed disks or drivers, it becomes rapidly pulverized, and

ciently fine to pass the required mesh it is delivered out of the machine. 4. The machine is inclosed and prevents the escape of fine particles.

Weights and Measures for Canada.—The regulations respecting the description of weights, measures, balances and weighing machines that will be admitted to verifica-

SCIENTIFIC AND TECHNICAL.

A German journal, *Fortschritt der Zeit*, speaks of

A NEW APPLICATION OF PAPER, which was accidentally discovered some time ago at the Portsmouth dry dock. A vessel was hauled up for repairs, and it was observed that a portion of the hull to which a piece of paper adhered was free from grass and mussels. Experiments were instituted

Hazard, finds, however, that if the plate, after careful desiccating, is coated with collodion and then varnished, it will resist moisture well.

Prof. Forbes, before the recent meeting of the British Association, reported that the committee in charge had constructed two

INSTRUMENTS FOR DETECTING FIRE-DAMP, the principle in the construction being founded upon the fact that sound traveled quicker in light gases than in dense ones,

acid, 1.7 parts of borax and 2 parts of starch in 100 parts of water. For cordage, canvas, wood or straw, they use 6 parts of boracic acid, 15 parts of sal ammoniac and 3 parts of borax in 100 parts of water; while for paper the mixture is 8 parts of sulphate of ammonia, 3 parts of boracic acid and 1.7 parts of borax. The latter solution is applied at a temperature of 122 degrees, and all are, it is said, peculiarly effective in preventing combustion.

Numerous methods for the rapid reproduction of letters, drawings, &c., are claiming attention. We have repeatedly called attention to those brought out in France, Germany, &c., and complete our list with the latest,

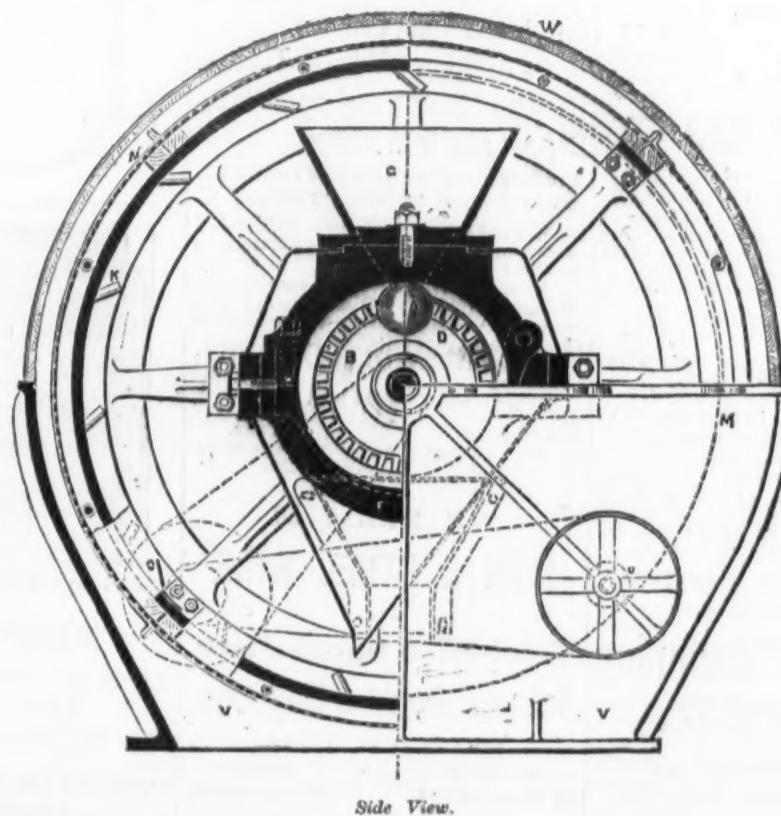
THE POLYGRAPH,

which is made as follows: A plastic mixture, composed of 500 parts (by weight) of white gelatine, 50 parts of glycerine, 50 parts of glucose, 50 parts of white glue and 350 parts of water, is poured hot into a shallow tin box of suitable size. The ink used for writing or drawing is made by adding to a suitable quantity of water 20 grams of violet aniline and 300 drops of alcohol. The ink is allowed to dry on the paper, which may be of any ordinary quality, and then the written side is laid on the plastic paste and is gently pressed on with the hand. After waiting for a minute the paper is neatly raised, and the writing will be found to have been transferred to the surface of the paste. From this as much as 50 copies can be taken without the aid of the press. What is left of the ink is carefully washed off by means of a warm sponge.

In the *Chemiker Zeitung*, Herr Hardung gives some details on the

MANGANESE COPPER,

an alloy made at Isabellenhütte, near Dillenburg, Germany, where an alloy consisting of 70 per cent. of copper and 30 per cent. of manganese is produced. It is used as an addition to brass, bronze, &c., for increasing the density, tensile strength and ductility of the metal, as the formation of oxides of tin or copper, which impair the physical properties of the material, is prevented by the great ease with which manganese is oxidized. Metallic manganese is also made for the same purpose, and our authority states that an addition of $\frac{1}{4}$ to 1 per cent. of manganese and of $\frac{1}{4}$ to 3 per cent. of the manganese copper alloy will insure a solid casting. Larger amounts of manganese—for instance, 2.3 to 6 per cent.—make the metal particularly hard, and it is stated that bronze can be made in this manner to assume the hardness of steel. The following alloy is said to be excellent for metal for bearings: 80 parts of copper, 9 of manganese copper alloy, 6 of tin and 5 parts of zinc. This confirms the experience of English investigators with manganese bronze,



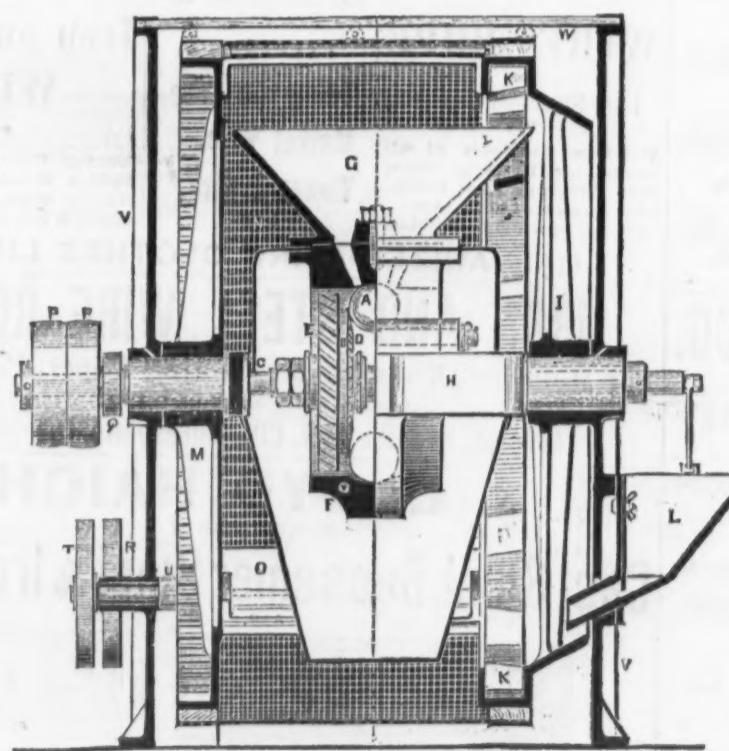
Side View.

which led to an application for a patent for paper sheathing. As it can easily be impregnated with poison, it will probably act as a protection against borers as well as against ordinary fouling.

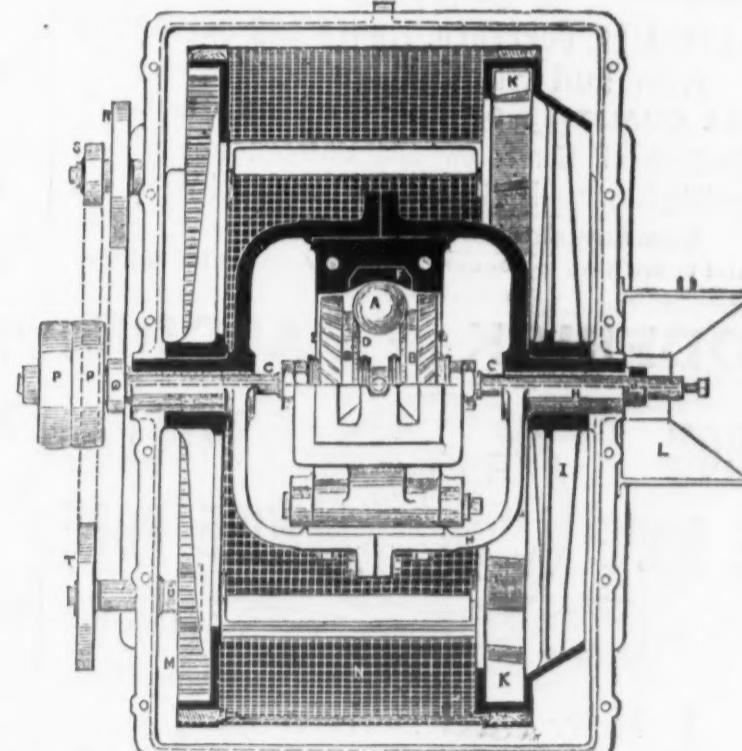
Very important improvements have been made within the last year by the

UNIVERSAL PROCESS IN PHOTOGRAPHY, The collodion being superseded by gelatine.

and that air which was contaminated with fire-damp was lighter than pure air. The committee further stated that they had tested the instrument in Wharncliffe Silkstone Colliery, and found that it registered the presence of fire-damp with more readiness than any other, although the greatest quantity found was only 6 per cent., or 12 times the smallest quantity which Forbes'



Vertical Section.



Plan.

THOMPSON'S PULVERIZING AND SIFTING MILL.

is then, through the fans of each disk, raised out of the mill, and, falling down through the shoot into the rotating sieve, that part which is already crushed sufficiently finely passes through the sieve and out of the machine, while the remainder, or coarse portion, is caught up by a longitudinal collector and thrown again into the internal hopper to be reground. The 20-inch mill, which was exhibited in motion, is calculated to grind about 8 cwt. to 9 cwt. of coprolites to pass through a 50 mesh sieve per hour, with about 3-horse power, and runs at about 450 revolutions per minute; for other substance this output will

be increased to 1000 revolutions per minute under the Weights and Measures Act, are published in the *Canada Gazette*. The following balances are to be admitted to verification. 1. Balances having equal arms, and on which the load is suspended below the fulcrums. 2. Balances commonly known as steel yards, or Roman balances, having unequal arms. 3. Weights, ridges. 4. Balances with equal arms, and on which the load is placed above the fulcrums. The spring balances, which are largely used in these provinces, will now, we suppose, have to be discarded. Although convenient, they can certainly not be called perfect, and it is well they should go out of use.

plates are covered with a layer of bromide of silver held in suspension in gelatine. Great care is necessary in preparing the mixture of gelatine and bromide, and in preserving it from the action of light. The time of exposure is reduced from ten and fifteen to a few seconds. The development must not be made with the use of too much light, so that the picture is slow in coming out. The new process is remarkable for the sensitiveness with which it gives details, and with which shadows and half tones are brought out. One great trouble with these gelatine negatives has been that they suffer very easily from moisture. Mr. J. S.

indicator was able to detect. Some alterations were recommended in the instrument, and the committee added an opinion that it would be very useful in ensuring the safety of mines.

Messrs. Martin and Tessier, of Paris, propose to make

FABRICS AND PAPER FIRE-PROOF

by applying certain solutions, the composition of which varies according to the material to be treated. For all fabrics generally they use a solution containing 8 parts, by weight, of sulphate of ammonia, $2\frac{1}{2}$ parts of carbonate of ammonia, 3 parts of boracic acid, 1.7 parts of borax and 2 parts of starch in 100 parts of water. For cordage, canvas, wood or straw, they use 6 parts of boracic acid, 15 parts of sal ammoniac and 3 parts of borax in 100 parts of water; while for paper the mixture is 8 parts of sulphate of ammonia, 3 parts of boracic acid and 1.7 parts of borax. The latter solution is applied at a temperature of 122 degrees, and all are, it is said, peculiarly effective in preventing combustion.

According to the detailed statistics published by Mr. Hunt, the production of coal in Great Britain was, for 1878, 132,607,866 tons, hauled from 3768 collieries. The corresponding figures for 1877 were 134,610,763 tons and 3770 works, while in 1876 there were 4002 collieries producing 133,344,266

tons of coal.

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See Advertis-

ment, Page 28

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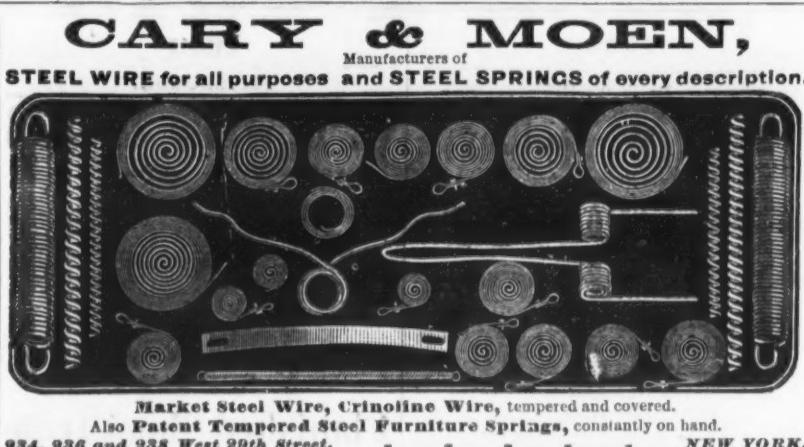
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**The Fire Risk of Steam Heating.**

Mr. William B. Whiting, secretary of the Manufacturers' Mutual Insurance Company, of Boston, gives the following information on this subject, as shown by the records of the underwriters:

Steam heating has now, for manufacturers, become almost universal, and has so many advantages over stoves in cleanliness, saving of valuable space, and the softness from slight escape of the steam, that it is beyond question the most desirable mode of heating such buildings, if safety can also be secured. We recognize the fact, that to the common mind it is perfectly secure, and that talking to the average workman or work-woman of danger of fire from a pipe containing only hot water is labor in vain; and that is also, to a certain extent, true of the overseers and even of the superintendents of many mills. The fact that fire can, by any possibility, be set by steam-pipes, is openly denied by many men of intelligence, as the writer has learned from contact with such men during the past 15 years. Many persons, however, have seen wood, which, by long contact with steam-pipes, has been converted into charcoal; and yet but few can be convinced that fire ever follows such charring. Perhaps no such firing has ever been actually seen to take place; but we are in possession of indubitable evidence, that, seen or unseen, it does take place, the burnt wood being in our hands, with unquestionable traces of burning, not merely charring, thereon. Precisely how the firing takes place we do not undertake to say, whether by simple contact, as a red-hot iron would fire any combustible, or by chemical action induced by the heat. This is a question for the scientist, and one, perhaps, not yet fully understood; and we are content to leave the subject with the chemist, satisfied with the present purpose to know, that, by whatever process the fire may be produced, it is produced, and is an active element of danger in all buildings where steam is used for heating, drying, or for any purpose.

In manufacturing establishments we usually find very little care taken to prevent contact of steam-pipes with combustibles, especially in such as have been built for a considerable time. In those more recently constructed it is usual to leave spaces around the pipes where they pass through floors, partitions, &c.; and, in some cases, thick thimbles of cast iron are introduced, which, perhaps, to a considerable extent remove the danger; but, were soapstone or plaster-of-Paris thimbles substituted, the work would be more perfectly done. After this provision for safety has been made, nothing further seems to be considered necessary; and the pipes are ranged along the walls, under the windows, in a very convenient position to receive and hold the brooms, brushes, speeler and spinning-bobbin, wash-rags, towels, old shoes, bunches of wiping-waste, &c.; and the operatives do not fail usually to improve the opportunity offered them of using the pipes for all such purposes, modified just in proportion to the taste for neatness in the overseer or agent of the concern. In some properties nothing of this is seen whatever; but the majority are open to charges of neglect, and many are decidedly slovenly. Articles hung upon the walls, or garments lying in the window-stools, are frequently left in contact with the pipes below them; and fires have been known to have originated in this manner.

It may not be necessary to urge further the reality of danger from steam-pipes, but proceed to the consideration of a remedy for an admitted hazard. We propose, as the only proper and sensible method, that the heating-pipes be raised up to the top of the rooms, or at least 6 to 8 feet from the floors, thus removing them from the alleys, sometimes quite narrow, and gaining room thereto, which will allow the boxes for roving, bobbins, waste, &c., and the overseers' benches, and the wardrobes, to be pushed back solid against the walls; and in cases where the alleys are very narrow, and the operatives have been subject to burn themselves against the pipes, this evil will be removed.

The pipes already in may, by increasing the length of the feeders, be raised bodily, remaining relatively to the walls in the same position they have heretofore occupied—one pipe over another; or, if it be preferred, the coil may occupy a horizontal position, suspended on suitable hangers or brackets. Thus far we find no difficulty; but to convince those interested that they can heat a room as rapidly, as cheaply, and as comfortably, by pipes suspended near the ceiling as when near the floor, is a task, perhaps, too great for us.

We are met at once, whenever this subject is broached to one who has never seen a trial of it, by the truism that "heat rises." This is, of course, admitted; and when a pipe on the wall near the floor has steam admitted to it, and the surrounding air becomes heated, it rises at once to the top of the room; and if it did not come down again, the condition of the center of the rooms at the floor in a 90-foot mill would be anything but comfortable with the mercury at zero. The fact that no one complains of a proper distribution of heat in one of these wide rooms is a sufficient answer to the usual objection, "heat rises." It does rise; and it falls also, and moves all over the room, and that whether the room be 40 feet or 90 feet in width. When a pipe becomes hot by the steam, the air surrounding it also becomes warm, and as heat rises, is set in motion from the pipe; upward at first, but probably outward from the hot surface in nearly all directions; the colder air moves inward toward the partial vacuum, and these currents transmit the heat in every direction, until the whole room has felt its effects. The question is whether, if the pipe be located near the top of the room, instead of near the bottom, the same result is obtained, and as quickly and economically. An answer to this question, to be of value, must be the result of experiment. No mere theory will convince any one.

Some 14 years since the writer induced the owner of a woolen mill at Rockville, Conn., to change the heating pipes in an upper room of his mill (used chiefly for drying wool upon the floor) to a point near the top of the room, as a matter of safety alone, not having the question of heating the room

in mind at the time. This change was made, and on a subsequent visit it was noticed that this change had been made throughout the mill. This was a surprise, and led to a questioning of the owner as to results. He was asked if the rooms were as well and economically heated as before, and his answer was in the affirmative. He was asked if any complaint was made by the people of undue heat on their heads, and the answer was a negative. He said that on inquiry upon this point of the overseers, they told him that in some cases the rooms were found hot overhead when they first entered in the morning, but that, as soon as the shafting and belts were put in motion, all this feeling of heat disappeared. Since that time several manufacturers have adopted the plan partially or wholly, and with satisfactory results as to heating, and, of course, with advantage in getting the pipes out of the way. Among these are the Messrs. Cheney Brothers, silk manufacturers, who have adopted the plan both at Hartford and South Manchester, and the Rock Manufacturing Company, Rockville, Conn., C. Fitton agent, who have changed their entire establishment, containing 21 sets of cassimere machinery, except one or two coils in the repair shop.

The following information is furnished by Mr. Atkinson as to his own observation, and also in reply to a request for information made to an English cotton spinner of wide reputation:

"In connection with your statement in respect to the right position for steam pipes for heating, my observation in England, since confirmed by correspondence, is to the effect that such pipes are there almost universally hung from the ceiling. In answer to a letter of inquiry, written since the subject was broached in this office, I have received the following communication from one of the largest spinners in Manchester:

"In reply to your inquiries about the position of pipes used for heating mills, I have spoken to several machinists and mill-owners, and all the information I can get is that almost universally the steam pipes are hung from the ceiling, on account of the advantages of having them out of the way, and also because in a large room the heat can be more generally diffused than would be if the pipes were placed only against the walls.

"I suspect that the point of importance attached to your inquiry is not so much one of economy of fuel—though I won't forget this—but rather of efficient ventilation, as affecting the health of workers, and giving the desired temperature needed for good spinning.

"My present conviction is that the ventilation of mills should be by down drafts, because the dirt and impurities driven off the machines would then be removed before they could reach the mouths of the workers. This would surely be the case with most machines in a cotton mill, as they are generally below the level of the mouths of the workers. (As I write, a doubt has come into my mind as to whether this is so with children).

"Tobin's system of ventilation is much used for houses, but whether for mills I don't know. This system is that a pipe should be brought from the outside, through the wall, near the floor, and taken upward into the room, say for about three-fourths of the height from the floor to the ceiling. By this arrangement the draft of air strikes against the ceiling, and is diffused equally, in a level stratum, over the whole surface of the ceiling, and comes down to escape by the doors or fire-places, or other openings."

This testimony all seems to point one way, and to sustain us in our views as to the location of heating pipes; and although the number in this country who have experimented is small, their intelligence and standing is unimpeachable. If, as we are informed, the plan of overhead pipes is in England almost universal, it seems that our manufacturers ought to give the proposition a fair consideration. If any one be now engaged in building, we would urge him to examine the plan; and if any having crowded rooms could be induced to change his pipes, we feel sure that he would thereby make his property safer and more comfortable."

[Note.—The foregoing seems to us to be all wrong, theoretically and practically, so far as regards the propriety of suspending steam pipes from the ceiling for any other reason than convenience in having them out of the way. In our judgment, the proper method of warming a large mill, or church, or public place of any kind, is to warm the floors. When this is done, no other heating by direct or indirect radiation is needed, good ventilation is easily secured, the health and comfort of occupants promoted, and the headaches and drowsiness resulting from hot heads and cold feet avoided. The fire risk, incident to the method of disposing of steam pipes now usually employed, can be as well, or better, avoided by carrying them through fire-proof channels under the floors in such a way that contact with wood-work is wholly guarded against. This system will heat a mill or public building comfortably at very much less cost for fuel than is usually considered necessary, for the reason that, with warm feet, a person remains entirely comfortable in a temperature which under other circumstances would seem chilly.—Editor *The Iron Age*.]

Railway Accidents in England During 1878.—The total number of persons returned to the Board of Trade as having been killed in the working of the railways in England during the year 1878 was 1053, and the number of injured 4007. Of these, 125 persons killed and 1752 persons injured were passengers. Of the remainder, 544 killed and 2003 injured were officers or servants of the railway companies, or of contractors; and 384 killed and 252 injured were trespassers and suicides, and other persons who met with accidents at level crossings or from miscellaneous causes. Of the passengers, according to the returns made to the Board of Trade, 24 were killed and 1173 were injured from accidents to trains. In addition to the above, the companies have returned 59 persons killed and 2050 injured from accidents which occurred on their premises, but in which the movement of vehicles was not concerned, and which, consequently, cannot be considered as "railway accidents."

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The War of the Telephones.

One of the most interesting patent litigations ever witnessed in this country is now imminent, growing out of the conflicting claims of rival inventors and patentees to the ownership of the telephone. Already nearly a hundred patents embodying supposed improvements in telephones have been issued, and more than a dozen interference suits are now pending before the Patent Office, brought in the names of as many patentees.

The general public knows only of the business rivalry between the Bell Telephone Company, on the one hand, and the Western Union Company, owning the Edison patents, on the other; but before the courts and the Patent Office the controversy takes a character entirely different. The merits of the case are very difficult to reach, and seem not to be fully understood even by experts in electricity or patent law. So many fine points in electrical science and in patent law, the most evasive and crooked of all branches of jurisprudence, enter into the matter that one becomes involved from the outset in a labyrinth of technicalities so dense that a just and intelligible solution seems to be an impossibility. The interference cases are set for a hearing some time next February, and the time meanwhile is being taken advantage of by the counsel to take testimony bearing upon the cases.

Stripped of side issues, the immediate controversy appears to be narrowed down to the question of priority in the application of the principle of the undulatory current to the transmission of spoken words. Several years before the issuance of the first American telephonic patent, a German named Reis experimented in telephones, and is said to have succeeded in transmitting musical tones and vowel sounds by wire. Reis published an account of his experiments, with plans, an examination of which in the light of to-day makes one marvel that success should have eluded him. He made use of the same diaphragm which forms a part of all successful telephonic systems.

In July of 1875, Elisha Gray, of Chicago, obtained a patent upon a system of transmitting musical sounds, which it was thought at the time would form the basis of a system of multiplex telegraphy. Each note in the scale was to be made the medium of communication between different points. The principle is said to be theoretically perfect.

Prof. Bell's patent, the application for which was filed on the 14th of February, 1876, is based upon the employment of undulatory currents of electricity. The electrical current is never absolutely broken, but effects are produced by a variation in the strength of the current put upon the wire. This principle is a necessary part of every successful telephonic system, and by its means every variation in the volume of the human voice may be made to produce corresponding variations in the magnetic effects transmitted from point to point by telephone. Prof. Bell made no claim to the discovery of the undulatory current principle, but merely to its application in the manner set forth in his application. The claim of the Western Union is that the principle of the undulatory current was covered in the Gray patent. The settlement of this question will probably be only the first in the contest, however, which involves many other points.

The Tube Trade in England and the German Tariff.

The London *Engineer* says: The gas tube trade has been one of the earliest British industries to feel the prejudicial effect of the increased German tariff, to which we lately drew attention. Germany has long been one of the best customers of the wrought-iron tube maker, both in England and Scotland. The orders have been for heavy quantities, and they have come forward with striking regularity; the monthly orders from the leading markets of the Zollverein have largely contributed to the activity of the British tube mills. An order embracing tubes of the value of £3000, even at present reduced prices, has been by no means an exceptional one. On the contrary, such an order might be looked for by leading firms with tolerable confidence monthly during the busy part of the year. All this, we fear, is now to suffer a very unsatisfactory change. We have information that immediately upon the coming into operation of the new tariff, its existence became known to one of the chief establishments for wrought-iron steam and gas tube making in this country, by the receipt of a telegram desiring that an order of the value we have just indicated should not be executed. The countermand came close upon the heels of the post letter which inclosed the order. A subsequent explanation from the customer showed that the duty of 50 per ton, which is now levied upon British tubes, would prevent the continuance of the business hitherto conducted, and that the imposition of the duty was the sole reason of the countermand. The withdrawal of even one order of 200 tons of tubes in a month is not a light matter to any tube-making firm. But when such an order embraces only part of the requirements of a market amenable to the influences which have induced its suppression, then the significance of the cause is great. And it happens that there are English firms who number nearly a dozen good tube buyers in the German market. These buyers our manufacturers believe they have lost so long as the tariff remains in operation. Previously the Germans had so far increased their tube-making capabilities that the trade, though valuable still, had nevertheless begun to fall off. Indeed, it is notorious that both German and Belgian firms have lately been securing orders from even London gas companies. Nor have the locomotive tube makers of Germany been less determined in their assault on the English center of that industry. One English railway company is known to have agreed with certain German producers for a twelve-month's supply. So high a tariff as £2. 10/- cannot, therefore, have been at all called for in the interest of German manufacturers, if it was not intended wholly to cut off the importation.



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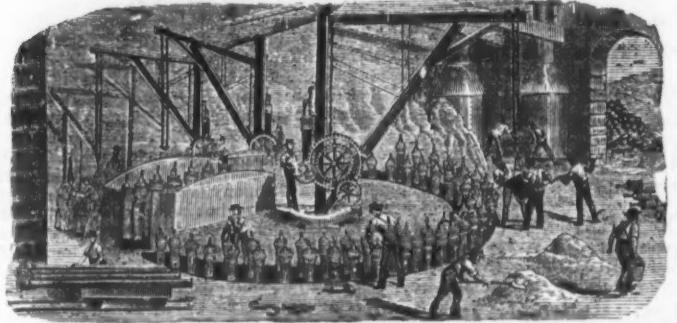
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This Steel is made from Chromium and Iron, and is remarkable for Strength, Durability and Uniformity. Send for Circular, where the price will show it does 25 to 75 per cent. more than other cast steel. It is adapted to all kinds of work where cast steel is used. Chrome Steel Castings from 25 to 500 lbs. to order.

Southern Advertisements.

ROANE IRON COMPANY,

Manufacturers of and Dealers in

Pig and Railroad Iron.

CHATTANOOGA, TENN.

WASON CAR & FOUNDRY COMPANY,

Chattanooga, Tenn.,

Manufacturers of

RAILWAY FREIGHT CARS, Car Wheels and Castings.

T. J. BROWN,

Rockwood, Tenn.

Miner and Contractor of

Fossiliferous Ores.

A superior article delivered at low figures at any furnace within the district or at any point on the Ohio River. Refer to Roane Iron Co., Chattanooga Iron Co., or S. B. Lowe, Chattanooga.

S. B. LOWE,
Pig Iron, Storage &
Commission.

Dealer in Charcoal and Coke Pig Iron for Foundry, Forge or Car Wheel purposes.

Chattanooga, Tenn.

STANDARD
GIRARD WRENCH.
WARRANTED.

FOR
STRENGTH
AND
Durability
IT HAS
NO SUPERIOR.
GUARANTEED
IN
EVERY RESPECT.

Wrought Bar, Head
and Screw.

Owing to the increased demand for these justly popular wrenches, we are now manufacturing more than any other establishment in the world.

Our wrench having been imitated by other manufacturers, we have adopted the above Trade Mark, and will hereafter stamp all our goods.

SEND FOR
TERMS and PRICES.GIRARD WRENCH MFG. CO., Girard, Pa.
A. Garrison. J. H. Ricketson. Wm. Holmes

PITTSBURGH FOUNDRY.

A. GARRISON & CO.,

Manufacturers of
Chilled Sand and Patent
Homogeneous Steel

ROLLS,

Both Solid and Hollow.

Ore and Clay Pulverizers, Rotary Squeezers, Haakin's Patent Double Spiral Pinions, and Rolling Mill Castings of every description.

OFFICE, 6 Wood St., PITTSBURGH.

Bridgewater Iron Co., Bridgewater, Mass.

Manufacturers of

SEAMLESS DRAWN

COPPER AND BRASS TUBES,

TACK PLATES,

Forgings of every description.

Bridgewater Iron Co.'s

HORSE NAILS.

PRICE LIST.

Nos. 5 6 7 8 9 10
Per lb. 5¢ 23¢ 24¢ 25¢ 26¢ 27¢

Liberal discounts to the Trade.

73 Pearl Street, New York.

28 Broad Street, Boston.

Coal.

A. PARDEE, Hazelton, Pa. J. G. FELL, Phila.

A. PARDEE & CO.

303 Walnut St.,

PHILADELPHIA,

No. III Broadway, New York.

MINERS AND SHIPPERS OF

Lehigh Coals.

The following superior and well-known Lehigh Coals are mined by ourselves and firms connected with us, viz.

A. Pardee & Co. HAZLETON, CRANBERRY, SUGAR LOAF.

Pardee, Bro. & Co. LATTIMER.

Calvin Pardee & Co. HOLLYWOOD.

Pardee, Sons & Co. Mt. PLEASANT.

THE HOBOKEEN COAL CO., Dealers in

SCRANTON, LEHIGH and other COALS.

Retail Yard on D. L. & W. Railroad, cor. Grove and 10th st., Jersey City. Coal delivered direct from shutes to carts and wagons. Families and manufacturers supplied with all descriptions of Coal at the lowest rates.

OFFICES: At yard cor. Grove and 10th st., Jersey City; Room 55, 111 Broadway, N. Y. General Office, Bank Building, cor. Newark and Hudson sts., Hoboken. P. O. Box 247, Hoboken.

MINERS' CANDLES.

Superior to any other Light for Mining Purposes. Manufactured by

JAMES BOYD'S SON,

Nos. 10 & 12 Franklin St., New York.

IVES' PATENT BURGLAR PROOF DOOR BOLT.

Can be applied wholly by boring, and is a



sure protection against burglars or tramps.

MY NEW DOOR BOLT.

in Nickel plate or Bronze, is designed for both out and inside doors, your sleeping or bath-room, throughout a hotel, or on any door that may need inside bolts. It will take the place of the more common Flush or Barrel Bolt, being as easy to apply, leaving your door more secure and of better finish, and besides it fills the place of many a more expensive bolt that operates no better or any more secure. Agents.

GRAHAM & HAINES, 113 Chambers St., New York.

A. T. YOUNG, 36 Pearl street, Boston; LATHAM & MATTHEWS, N. E. cor. Sixth and Commerce st., Philadelphia, Pa.; POTTER & COPELAND, 21 E. Congress st., Detroit, Mich. Price list sent on application. HOBART B. IVES, Sole Manufacturer, Fair Haven, Conn.

THE LARGEST PUMP WORKS in the WORLD
OVER 800 DIFFERENT STYLES.
Pumps, Steam Pumps, Rotary Pumps,
Centrifugal Pumps, Piston Pumps,
for Tanners, Paper Mills, Fire Purposes, suitable for
all stations imaginable.

CLOSE-TOP CISTERNS PUMP, Fig. 101.



Also, HAND FIRE ENGINES.
Send for Catalogue. Address,
RUMSEY & CO., Seneca Falls, N. Y., U. S. A.

W. & B. DOUGLAS,

Middletown, Conn.,

The Oldest and Most Extensive Manufacturers of

PUMPS,
HYDRAULIC RAMS,
GARDEN ENGINES,
Yard Hydrants, Street Washers,
WIND-MILL PUMPS

AND OTHER

Hydraulic Machines IN THE WORLD.

Awarded the GRAND MEDAL at
WORLD'S EXPOSITION, Paris,
France, 1878, being the highest award on
Pumps, &c.; also the highest medals at
Paris, 1867, Vienna, 1873, and Philadelphia
1876, accompanied by the Report of Judges.

Descriptive Catalogues and Price Lists
sent when requested.

BRANCH WAREHOUSES,
85 and 87 John St., N. Y.,
AND
197 Lake St., CHICAGO, III.



CUT TACKS, SHOE NAILS, WIRE NAILS,
Pat. Brads, Finishing Nails, Clout Nails, Trunk Nails, Hungarian Nails,
Cigar-Box Nails, Basket Nails, 2d and 3d Fine Nails.

Carpet Tacks, Upholsterers' Tacks, Gimp and Lace Tacks,
Brush Tacks, Copper and Brass Tacks,

BRASS AND IRON ESCUTCHEON PINS, &c., &c.,

MANUFACTURED BY

DUNBAR, HOBART & WHIDDEN, So. Abington Station, Mass.

New York Salesroom, 39 Warren St. Goods made to order from sample.

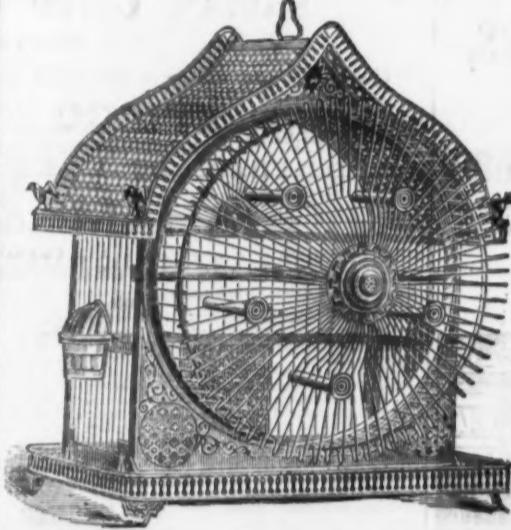
Particular attention given to orders for EXPORT.

JEWETT'S

Revolving Perch

BIRD CAGE.

PATENTED.



The Revolving Perch Cage must be seen in practical operation to be able to appreciate what a charming novelty it is; or the great advantage to the bird, in the way of exercise, which all canaries require to keep them healthy, and consequently in song.

Catalogue sent to dealers only on application.

Also Manufacturers of the handsomest line of Bird Cages in the United States.

JOHN C. JEWETT & SONS,
BUFFALO, N. Y.

CHAMPION
HOG RINGER
RINGS and HOLDER.

Only double Ring ever invented.

The only Ring that will effectually keep Hogs from rooting.

No sharp points in the nose.

Ringers, &c., Rings, &c., Holders, 75c. Huskers, 10c.

CHAMBERS, BERING & QUINLAN, Exclusive Manufacturers, Decatur, Ill.

BROWN'S
HOG and PIC
RINGER and RINGS.

Only single Ring in the market that closes on the outside of the nose.

No sharp points in the nose to keep it.

center of the pin will be, as nearly as possible, 0.326 of an inch, or say 4-1000ths less than $\frac{1}{8}$ of an inch. The diameter of a steel pin or rivet suitable for holding the jaws and withstanding such a pressure is 0.132 inch. Now, subtracting 0.066, half the diameter of the pin, from 0.326, the length of the jaw from the center of the pin, we have 0.260, or, as nearly as possible, $\frac{1}{4}$ inch—a distance so small as to make practical working very difficult except on wire that could be easily cut by the ordinary nippers.

The Compound Lever Nippers have, as will be seen, few movable parts—four pins upon which the jaws and handles work, and two side plates. In order to make these tools economical as well as useful, every portion is made interchangeable, so that when a cutting edge is worn out or breaks, instead of throwing the tool away and buying a new one, a jaw or handle may be taken out and a new one put in its place. The manufacturers sell not only the completed tools, but also the parts, jaws costing about one-quarter the price of the finished tool, while the handles cost only about one-fifth or one-sixth. Every portion of the work is done in a style which very closely approaches that found in good fire-arms. All the screws, even to the little set-screws that regulate the distance between the cutting edges, are neatly finished in the finest machine work. By means of the set-screws mentioned, the distance between the edges when the cut is finished is very accurately adjusted. Usually they are set so that when there is full pressure upon the handles, there is a small space between the edges. This is barely perceptible when they are held up to the light. In the pair now before us this amounts to 0.0012 inch. The manufacturers make a number of claims for this tool; among them we find the following, which seem to be well taken: The plates support the rivets and hold the jaws so firmly that lateral motion is entirely prevented, even when the wire is put into the outer corners of the jaws. Accurate adjustment of the jaws prevents them from injuring themselves and insures good cutting. The power of fourteen to one is so great as to make a very compact tool, more than equal to large and bulky ones of the ordinary pattern. A small spring keeps the jaws always open, and the tool is consequently ready for use at once. All the parts of any given size of nipper are made perfectly interchangeable, and hence great advantage follows when jaws or other parts break or wear out.

Messrs. Peter A. Frasse & Co., 95 Fulton street, New York city, are the sole agents.

THE AVALANCHE

ROTARY, FLOUR AND MEAL



SIFTER

Scoop, Measure, Mixer, Weigher, Egg Beater, Rice Washer, Tomato, Starch, Wine and Fruit Strainer.

Guaranteed the very best, and the cheapest to the jobbing trade. It commands itself wherever shown.

WRITE FOR PRICES.

N. DUBREUL & CO., 141 & 443 Plum St.

Lantern and Sieve Manufacturers.

CINCINNATI, O.

SMITH BROS. & CO., Agents, 73 Fulton st., N. Y.

Full Size of Second Class Brass.

Bird Cages.

Wires on both classes fastened without solder.

The cheapest and most valuable in market.

947 & 249 Pearl St., New York.

John Maxheimer,
Manufacturer of
Patented
Japanned, Tinned
Wire,
First and Second-
Class Brass

Bird Cages.

Power Loom Painted Screen Wire Cloth,

GILBERT'S RIVAL ASH SIEVE.

Galvanized Twist Wire Netting,

THE UNION METALLIC CLOTHES LINE WIRE,

Warehouse, 973 Pearl St., New York.

Office, 115 South Street, New York.

Factory, 33 to 40 Penn St., Brooklyn, N. Y.

TACKLE BLOCKS.

Rope and Iron Strap of all kinds.

Linumite Wood for Ten-Pin Balls.

Wm. H. McMillan & Bro.,

Office, 115 South Street, New York.

Factory, 33 to 40 Penn St., Brooklyn, N. Y.

Portable Fire Annihilator.

FIG. 279.

Double Compound Lever Cutting Nippers.

Our illustration represents a new invention in the way of cutting nippers, by which great cutting power is obtained in small space, without the necessity of using long handles or very short jaws. These nippers are the invention of Mr. Thomas G. Hall.

They consist of a pair of jaws for cutting, held by pins passing through two side plates, and having shanks extending downward between the plates far enough to embrace the heads of the handles.

The handles themselves are hinged by a couple of pins in the lower part of the side plates, and are so proportioned that they multiply the pressure in about the ratio of 9 to 1. One arm, or shank, as it might be termed, is a little longer than the other, so that, as we measure the arms, the pressure from the handles to the cutting edges is multiplied in the proportion of 1 to 12. The manufacturers say the pressure, accurately measured, is 14 to 1.

This gives an enormous cutting power. With the smaller proportion of parts mentioned, a 5-inch nipper of this pattern has as much cutting power as an ordinary pattern, such as Stub's nipper would have with 15 $\frac{1}{4}$ -inch handles, if of the usual proportion of handle and jaw.

It will be seen on examination of the tool that if double levers are not used, and it is attempted to obtain the same multiplication of the pressure that is obtained in this tool, the amount of motion in the jaws themselves will be so small, and the cutting edges so near the pivot, that the tool will be comparatively valueless.

Thus, the greatest movement of the handles that can be conveniently obtained in a 5-inch tool is about $1\frac{1}{4}$ inches. One-twelfth of this is 0.146, or, as nearly as possible, $\frac{1}{4}$ of an inch. Taking the available length of handle, 4 $\frac{1}{4}$ inches, the distance from the cutting edge to the

the Isle of Man. It will also be cheaper to carry goods from Barrow-in-Furness to York and other points in the vicinity than by the way of Liverpool. The new line will be running in about a month.

A Large German Iron and Steel Works.

Next to Krupp's famous establishments, the largest German iron and steel works are those of Actien Gesell. für Bergbau, Eisen- und Stahl-Industrie "Union," of Dortmund, an idea of the extent of which may be conveyed by the following figures:

The iron and steel works at Dortmund have three blast furnaces and 100 coking furnaces, the production of Bessemer pigs being 48,000 tons. There are also Bessemer steel works, with hammer works, a rail-rolling mill, and a tire mill, capable of producing from 60,000 to 70,000 tons of steel rails and 12,000 to 15,000 tons of tires, axles and forgings respectively; Siemens-Martin works, puddling furnaces, and iron-rolling mills, with an average production of 30,000 tons of merchant iron, &c.; bridge works, with a capacity of 10,000 tons per annum of bridges, roofs, turntables, &c.; railway switch and crossing works, with a yearly production of 600 switches, &c.; an iron foundry, producing 4000 tons of castings per annum; and wheel and axle works, with forge and turning shops, capable of sending off 3750 sets of wheels and axles for wagons, tenders, and locomotive engines per year. This will give some idea of the great extent of the Dortmund Works, but this is only one of several. At Aplerbeck they have puddling furnaces and rolling mills, capable of turning out 15,000 tons of iron merchant bars of all kinds in the year. At Horst, near Steele, on the Ruhr, the Union Company have two blast furnaces and 80 coking furnaces, with annual capacity of from 33,000 to 35,000 tons of puddled pigs per annum; puddling furnaces and rolling mills for I, angle channel iron, &c., and iron sleepers for railways; wire-rod mills; steel works with 12 Siemens-Martin furnaces. At Heinrichshütte, near Hattingen, the company own four blast furnaces and 170 coke ovens, capable of producing 72,000 tons of pig iron both for puddlers and Bessemer steel manufacturers; puddling furnaces and rolling mills, with a capacity of 18,000 tons of plates, sheets, and angle iron, from the smallest to the largest dimensions; foundry with mechanical workshops, capable of turning out from 4000 to 5000 tons of castings per year; malleable steel casting works with a capacity of about 1000 tons per annum; and lastly Bessemer steel works with two 8-ton converters. At Olfersien and Hasslinghausen, there are six blast furnaces calculated to make 87,500 tons of pig iron per year. The company has 388 boilers; 289 steam engines, equal to 18,800 horse-power; 28 blowing engines for blast furnaces and Bessemer works; 23 locomotive engines; 24 portable engines; 85 steam hammers from 1 $\frac{1}{2}$ cwt. to 15 tons; 27 rolling mills; 164 puddling furnaces; 95 welding and re-heating furnaces; 49 coke ovens; 197 machine tools of all descriptions, and 15 blast furnaces. The Union Company have several collieries, producing 460,388 tons per annum; of this the Glück-auf Tiefe turns out 331,000 tons per annum. The collieries are in the mining district of Dortmund, in the Ruhr Valley, as are also the most important iron ore mines. They have also iron mines in the mining district of Bonn (sub-district of Siegen), several mines in the Hartz Mountains, in Nassau, and in Sweden, and the production of all the mines is 122,230 tons. Nearly 6000 workmen are given employment by the company.

England's Trade with America.

A Sheffield market report in one of the London journals says:

Our business with America, both inward and outward, appears to be somewhat at a standstill. There are certain goods of American manufacture that have undoubtedly got a hold upon the English market, and the demand for them is well sustained.

There is that other class of articles often described as "knick-knacks" in which a large trade is also sustained; for the Americans, as is well known, are an inventive people, and before the inquiry for one novelty has had time to exhaust itself, another is introduced, so that travelers who carry them have always something new to show.

There is not much that is encouraging to say with respect to our exports to America. As one manufacturer remarked, "They are trying to diminish our trade with that country in every possible way."

The keenness with which some houses have felt the change that has taken place in our trade with America can scarcely be conceived.

We have heard of one house that used to send out 600 gross of table knives per week, and now they do not send out a gross in six months. For a long time the Americans did little in pocket cutlery; but now we are feeling their competition in that department.

Already in plain knives that can be made by machinery we cannot touch them—having regard to price and quality; but in finer grades, where quality is more considered than price, we can hold our own.

There has been a little improvement in the demand for Bessemer steel, but with respect to all other goods, business is extremely quiet. There is a good deal of comment among our manufacturers as to the active efforts of American Consuls over the world put forth to push the trade of that country. Indeed, they are spoken of as "a vast body of American manufacturers' agents," and there can be no doubt that they do their work exceedingly well.

They not only keep the American people well advised as to what is passing in the various business centers in all countries, not only make them acquainted with what class of goods is most in demand in different markets, but they even make personal calls upon likely people, and direct their attention to certain things that they would be able to deal in. In short, they do the work of commercial travelers under exceptionally favorable circumstances.

There are these and other difficulties with which our merchants and manufacturers have to contend, and some of the best informed of them assert that our business with America will never be better until retaliation would cause the food producers to come forward and disconcert the views of the protectionists.

SEAMLESS COPPER TUBING,

MANUFACTURED BY

JOHN C. JEWETT & SONS,

BUFFALO, N. Y.

THE AVANTAGE

OF THE

SEAMLESS

Brass & Copper

TUBING,

MERCHANTABILITY & CO.,

PHILADELPHIA.

THE UNIVERSAL

LIFTING JACK,

For lifting carriages,

AUBURN FILE WORKS,
Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
FULLER BROS., Sole Agents,
89 Chambers and 71 Reade Streets, N. Y.



McCAFFREY & BRO.,

PENNSYLVANIA FILE WORKS,
Philadelphia, Pa., U. S.



Manufacture and keep in stock a full line of FILES and RASPS only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.



SNELL MFG. CO.,
FISKDALE, MASS.,
MANUFACTURERS OF

Augers, Auger Bits,
BORING MACHINES & BORING IMPLEMENTS.

TENNIS & WILSON,
Sole Agents,

80 & 82 Reade St., NEW YORK.
FIRST MEDAL AND AWARD

given to the SNELL MFG. CO. for the highest standard of perfection attainable.
Centennial Exhibition, Philadelphia, 1876.



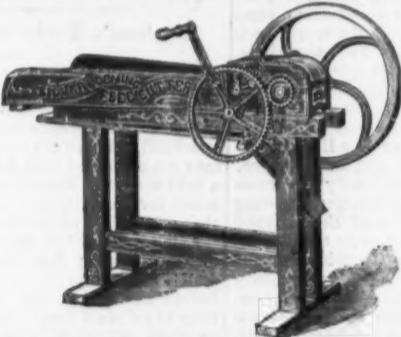
SNELL'S JENNINGS PATTERN BIT,
Manufactured from Extra Cast Steel and warranted.

SOLE MANUFACTURERS OF

Rice's Patent Superior Boring Machines and
Snell's Upright Machines.

Snell's Solid Cast Steel Augers, Auger Bits, Car Bits,
Screw Driver Bits, Taper Pod Gimlets, Taper Pod
Gimlet Bits, Countersink Gimlet Bits, Long
Millwright Augers, Long Rafting Augers,
Coopers' Doweling Bits,

AND ALL KINDS OF MACHINE BITS MADE TO ORDER.



SILVER & DEMING MFG. CO.,
SALEM, OHIO,
MANUFACTURERS OF

THE SILVER & DEMING FEED CUTTER.

Seven sizes for Hand and Power.

Send for prices and discounts.

RIPLEY MANUFACTURING CO.,
Unionville, Conn., U. S. A.



BEST PORCELAIN-LINED LEMON SQUEEZERS.

"Common Sense" Mouse Traps.

HAND-MADE ROSEWOOD FAUCETS.

Housefurnishing Hardware.

FOR HOME AND EXPORT TRADE.

WM. R. HARTIGAN, Burlington, Ct.,
Manufacturer of all kinds of
TOOL HANDLES AND SEAT STICKS FOR CARRIAGES, &c.
Also all kinds of Enamelled Goods made of wood, such as Drop Knobs, Furniture Knobs, Organ Stops, Brush Handles, &c., &c. Also sole manufacturer of the Patent ANTI-NERVOUS TRIANGULAR PENHOLDER.
Send for Catalogue and Price List before purchasing.

F. R. EMMONS, Agent, 132 Duane St., New York.

[See advertisement in *The Iron Age* of September 4, 1879.]
WHEELER & MELICK CO.,
ALBANY, NEW YORK, U. S. A.,
Manufacturers of

**IMPROVED FARM IMPLEMENTS
AND MACHINERY.**

FILES &

Established 1868.
RASPS,

Best Cast Steel.

HAND-CUT. Manufactured by

JOHNSON & BRO.

No. 1 Commercial Street, Newark, N. J.

SPENCER & UNDERHILL,

94 Chambers St., N. Y., Agents for

American Screw Co.'s Wood, Machine and

Rail Screws, Stove and Tire Bolts, Rivets, &c.

O. Ames & Sons, Shovels, Spades and Scoops.

A. Field & Son, Tacks, Brads, Nails, &c.

G. F. Warner & Co., Carriage Clamps.

We have also on hand a general assortment of Hardware

and Tools.

For Superiority.

INTERNATIONAL EXHIBITION
AWARDED BY
UNITED STATES
CENTENNIAL
COMMISSION
PHILADELPHIA 1876.

1876.

PARIS.

1878.

PARIS.

A. FIELD & SONS,

TAUNTON, MASS.,

MANUFACTURERS OF

AMERICAN AND FRENCH

WIRE NAILS, TACKS, SHOE NAILS,

And Every Variety of Small Nails.

Offices & Factories at Taunton, Mass.

Warehouse at 78 Chambers St., New York,

where may be found a full assortment of Tacks, Brads, Wire Nails, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

Hoisting Machinery
MANUFACTURED BY
CRANE BROTHERS MFG. CO.,
Chicago.

STAR LOCK WORKS.
ESTABLISHED 1836.

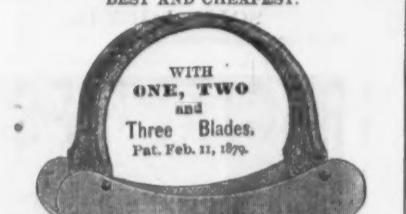
Trunk Locks,
Pad Locks,
Dead Latches,
**110 South 8th St., and Sansom, bet. 8th
and 9th, PHILADELPHIA.**



HILLEBRAND & WOLF.



**REDUCTION IN PRICE LIST
FOR THE FALL TRADE.**
AMERICAN MINCING KNIFE,
BEST AND CHEAPEST.



Catalogue of Hardware Novelties upon application.
PHILADELPHIA NOVELTY MFG. CO.,
591 Cherry Street, Philadelphia, Pa.

CLOTHES WRINGERS.



T. J. ALEXANDER, Manager,
BOSTON, MASS.

THE ANSONIA CORRUGATED STOVE PLATFORM, With Patented O. G. Border.

ROUND ZINC.

27, 30, 32, 34, 36 INCH.



Manufactured of heavy metal, requiring no nailing or lining, the edge retaining its form. Superior pattern, finish and quality, Price as low as any.

Send for List and Discount.

Packed 12 in each case.

THE ANSONIA STOVE REST.



STOVE RESTS are designed to place under the feet of Stoves and Ranges, for the purpose of raising them from the floor or platform. They are about $\frac{1}{2}$ -inch thick, covered with sheet metal in zinc, brass and nickel plate. Highly polished and finished. Packed one set of 4 pieces in each paper box, and 36 sets in each case. Sizes (inside of circle on top)

2, 2½, 2¾, 3¼ inch.

Send for full Description and Prices.

ANSONIA BRASS AND COPPER CO., 19 Cliff St., New York.

NEW YORK BELTING & PACKING COMP'Y

The Oldest and Largest Manufacturers in the United States
OF

Vulcanized Rubber Fabrics FOR MECHANICAL PURPOSES.

WAREHOUSE, 37 and 38 Park Row, New York.

ORIGINAL Solid Vulcanite EMERY WHEELS

LARGE WHEELS MADE ON CAST-IRON CENTER IF DESIRED.

The properties of these Wheels are such that they can be used with great advantage and economy for cutting, grinding, and finishing Wrought and Cast Iron, Chilled Iron, Hardened Steel, Slate, Marble, Glass, etc. These Wheels are extensively used by manufacturers of Hardware, Cutlery, Edge Tools, Plows, Safes, Stoves, Fire Arms, Wagon Springs, Axles, Skates, Agricultural Implements, and small Machinery of almost every description.

PATENT ELASTIC

Rubber Back Square Packing

BEST IN THE WORLD.

For Packing the Piston Rods & Valve Seats of Steam Engines & Pumps.

B represents that part of the packing which, when in use, is in contact with the Piston rod. A is the last band which keeps the part B against the rod with sufficient pressure to be steam tight, and yet creates but little friction.

This Packing is made in lengths of about 20 feet, and of all sizes from $\frac{1}{2}$ to 2 inches square.

JOHN H. CHEEVER,
Treasurer.

37 and 38 Park Row, New York.

Beardsley Scythe Co.,
Manufacturers of
GRASS, GRAIN & BUSH SCYTHES,
Hay Knives & Corn Knives.

West Winfield, Conn.

See our advertisement in The Iron Age first issue of each month.

RICHARD DUDGEON,

No. 24 Columbia Street, New York,

Maker and Patentee of the Improved

Hydraulic Jacks

AND

Punches.

Roller Tube Expanders and Direct Acting Steam Hammers.

Communications by letter will receive prompt attention.

Jacks for pressing on Car Wheels or Crank Pins made to order.

INDUSTRIAL ITEMS.

NEW HAMPSHIRE.

William Corey is about to occupy his new three-story brick needle factory at Manchester. The main building is 30 feet wide, with an L 12 feet square and a boiler room 24 feet square. The main apartment is in the second story, which is lighted by 19 windows, and where 35 hands will be employed in the manufacture of needles alone. On the ground floor is a room of commodious dimensions, which will be used for the engine, of Haskins' manufacture, 12-horse power, and as a machinery and repair shop. Adjoining it is the boiler room, with a concreted floor and solid 16-inch brick walls, where will be located an 18-horse-power boiler. Some 60 hands will be employed.

MASSACHUSETTS.

The Lowell File Works, of which Sager, Ashworth & Co. are proprietors, are busy with a rush of orders, and additions are constantly being made to their force of employees. Their specialty is hand-made files.

David Knox, machinist, of Lynn, has just built an addition to the rear of his shop, 15 by 36 feet, and one story in height, for forging purposes.

The Mount Hope Iron Works, at Somerset, according to their custom, were idle in August for the purpose of taking stock and doing general repair work on furnaces and machinery. They resumed operations on September 1. The report that the recent rise in the price of nails was the cause of their resuming is untrue. Their plate iron business and low stock of nails made resumption necessary. They had been running full up to July 31.

The Somerset Iron Works, Somerset, have been idle 15 months, and are still in that condition.

The Florence Tack Co., of Northampton, have lately been running their 40 machines 11 hours a day. The time from January to June was 12 hours, and it was then reduced to 10, because it was felt that the workmen ought not to work longer than that during the hot weather. The company have added materially to their capacity for production recently by increasing their machinery, in the hope of being able to catch up with their orders, but they are still behind.

CONNECTICUT.

Beecher & Peck, of New Haven, are very busy filling orders for the Peck patent drop press, of which they are the sole manufacturers. For the past three months they have been obliged to run 11½ hours per day to keep up with their orders.

NEW YORK.

Both furnaces of the Bay State Iron Co., at Port Henry, are in blast; also the Cedar Point Furnace and one of the Crown Point furnaces. The second stack of the Crown Point Iron Company will be put in blast in about three weeks.

NEW JERSEY.

The Cumberland Nail and Iron Company, at Bridgeton, have been in the habit of making 140,000 kegs of nails and 4,000,000 feet of gas tubes per annum, but during the great depression in the iron business they have not worked up to that figure. The company say that if the present condition of trade continues throughout the year, they will be more likely to exceed than fall short of those figures. These works were established in 1814, and were among the first to manufacture nails by machinery in the United States.

PENNSYLVANIA.

The immense works of the Thomas Iron Company at Hokendauqua are now in full blast, giving employment to fully 500 men. The works comprise eight stacks, six at Hokendauqua and two at Lock Ridge. This is the first time that all of the eight stacks have been running simultaneously. The capacity of all the stacks is about 100,000 tons annually, and they are running night and day. The company mines most of the ore itself.

The improvements at the rolling mill of the Birdsboro Iron Works are steadily progressing. A machinist from the Scott foundry recently began work upon setting up and putting together the new engine. The roll house and portion of the squeezer are in position, as is also the pipe to convey the water to the turbine water wheel. The nail factory has been whitewashed and much improved. The work of building the new railroad bridge across the Schuylkill at this place is going on rapidly. Messrs. Lovell & Co., of Philadelphia, have just erected a hoisting engine for the contracting parties, to be used in raising the building material. It works nicely, and is very effectual in accelerating the construction of the bridge.

The West Middlesex Rolling Mill was idle before last week, but lighted up for operation on Tuesday the 16th inst. The Wheeler Iron Company, like many others, was caught with a contract for pig iron on hand, which contract had to be filled, no matter what the ruling rates were.

The Fanny Furnace is doing first rate. The prospect of putting light in the Shenango furnaces is getting brighter every day.—Sharon Herald.

The Glendon Iron Company have five furnaces in blast at Glendon, and have recently put up a new blowing engine of 300-horse power.

The Reading Times and Dispatch of September 10 says: The Coleman heirs of Lebanon have just effected an important purchase of land immediately outside the borough limits. The purchase includes two farms, known as the John and Jacob Funk farms, and embraces some 160 acres. The amount paid was in the neighborhood of \$60,000. These farms were secured by the present owners by reason of the contiguity of the land to the junction of the Cornwall, Lebanon Valley and Pinegrove Railroads, which, as will be readily seen, furnish the key to very superior facilities for railway transportation. The idea is to locate a furnace at this point, the erection of which, it is rumored, will be commenced within short time by the new owners. It is claimed that, in addition to the excellent transportation facilities wh ch may thus be obtained, a saving of \$25,000 per annum in freights would be saved, as all the product of the Cornwall furnaces has to be carried over the

Cornwall Railroad to Lebanon, where it is delivered to buyers. An abundance of limestone is on these farms, so convenient and easily quarried that a saving in this direction would also follow. Heavy shipments of ore are now being made over the Cornwall road. During the month of August last there were transported over that road from the ore banks to Lebanon 30,000 tons of ore. At \$2.50 per ton—allowing 50 cents per ton, the cost of mining—the net profits per month foot up to the handsome sum of \$50,000, or at the rate of \$720,000 per annum, with a prospect of a still further increase as business continues to revive. Nearly all of the furnaces throughout the country that are being overhauled, rebuilt, &c., by Weimer & Bro. will be provided with Mr. Weimer's blowing engine, a specimen of which attracted so much attention at the Centennial Exposition. This engine costs some \$800, the kind formerly in use costing upward of \$25,000, quite an item of saving in this particular.

The Pottstown Iron Company will have a boiler plate tank made by Dennithorn & Bros., Spring City, the diameter to be 25 feet and the height 12 feet.

Pig iron is now being shipped away by boat and rail from the works of the Chestnut Hill iron company, near Columbia, at the rate of 100 tons per day, and this rate of shipment will be kept up until all the iron—about 10,000 tons—at present stacked in their yards here has been disposed of.

Work has been begun at Phoenixville on the iron cradle in which the great Egyptian monolith which is to be transported to New York is to be rocked. Some one will have to go to Egypt to put the machinery in position.—Reading Eagle.

Clark, Reeves & Co., of Phoenixville, have been awarded a contract for the building of three miles of bridge work for the government of Chili, South America, to be completed within two years.

Responsible eastern men are in Harrisburg negotiating for the lease of the Price & Co.'s Furnace in that city, the Dock Furnace below Baldwin, Dr. Heck's Emaline Furnace below Dauphin, the Richmond Furnace in Franklin county and the Antietam Furnace in Maryland.—Reading Eagle.

McLanahan, Stone & Bayley, Hollidaysburgh, are building an addition to their foundry. The new building is 23 by 48 feet, and is intended for making cores, &c. They cast recently a monster casting called a base ring for a furnace. It is in four sections, each one being about 20 feet in length and weighing some 6000 pounds. It will be shipped to one of the Johnstown furnaces.

The new iron company which has purchased the property known as the locomotive works, Lancaster, although for a number of years it has not been adapted to the manufacture of locomotives, will be ready to manufacture iron as soon as some small repairs needed are made and the necessary supplies are gathered together. The foundry and machine shop the company do not propose to operate, believing it to be more prudent to adhere strictly to the object of its formation, which is the manufacture of all shapes of rolled iron, excepting rails. The company has offers to rent the foundry and machine shop, and expects to make that disposition of them. The iron mill is in excellent order and is equipped for the company's business, as may be imagined from the early period at which it is expected to have it running. The capacity of the works is about 30 tons a day, and the demand for rolled iron is now so brisk that the mill is expected to be worked at once up to its full extent. The company has been organized, under the limited partnership act of 1874, by the selection of Andrew J. Steinman, chairman, Wm. G. Mendenhall as secretary and treasurer, William B. Middleton as superintendent, and Howard W. Middleton, F. W. Yarnall and R. H. C. Hill to act with the chairman and secretary as managers.

PITTSBURGH AND VICINITY.
We give below a tabular statement of the receipts of pig iron, ore, scrap and blooms in this city during the months of July and August. The figures show that the iron movement in August was larger in volume than that of any previous month in the history of the city. In the tables the first column shows the receipts of pig iron, the second those of ore, the third includes under the heading of "scrap," old rails, old wheels, &c., while in the fourth are grouped blooms, billets and muck bar:

	Metal.	Ore.	Scrap.	Bil'ms.
July.	Tons.	Tons.	Tons.	Tons.
P. F. W. & C. R. R.	4,288	5,728	489	365
C. & P. R. R.	528	11,376	168	444
P. & L. E. R. R.	53	7,800	.....	432
P. R. R.	4,476	36	900	276
A. V. R. R.	1,236	976	900	.....
West Penn. R. R.	3,920	.....	.....	.....
N. Y. & N. H. R.	1,282	12	384	73
P. C. & St. L. R. R.	60	.....	239	348
By River.	65	.....	566	.....
Total.	17,345	25,498	3,386	1,032
July, 1878.	10,225	15,400	1,820	532
	Metal.	Ore.	Scrap.	Bil'ms.
August.	Tons.	Tons.	Tons.	Tons.

Cutlery.

FRIEDMANN & LAUTERJUNG,

Manufacturers of

PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.
Sole proprietors of the renowned full concave patent

"ELECTRIC RAZORS,"
And the celebrated "ELECTRIC SHEARS." Nickel Plated Heads.

Agents for the BENGAL RAZORS.
AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.
91 Chambers and 73 Reade Sts., N. Y.
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MERIDEN CUTLERY COMPANY.

The "PATENT IVORY" HANDLE TABLE KNIFE.

The oldest manufacturers of Table Cutlery in America. Exclusive makers of the CELLULOID HANDLE for Table Cutlery. A most beautiful and perfect substitute for Ivory. Also makers of all kinds of TABLE, BUTCHER AND HUNTING KNIVES. Illustrated catalogues will be given to the trade on application. No. 49 Chambers Street, New York.



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Manufacturer of Pen and Pocket Cutlery, Pepperell, Mass.
My Blades are forged by hand from the best Cast Steel, and warrant-
ed. To me was awarded the Gold Medal of the Conn. State Agricultural Society.
Office in New York with E. P. Whipple, 100 Chambers St.

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Electro Plated Ware, German Silver and Britannia Spoons.



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MANUFACTURERS OF

Improved
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Absolute Safety!
Perfect Ease!

Time, Labor and Ma-
terial saved by using the

NICHOLS' ACID PUMPS,
to draw all kinds of acids from
carboys. Every pump war-
anteed. Send for new circular
and price list. Manufactured
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FACTORIES,

New Britain, Conn.

WAREROOMS,

29 Chambers St.,
New York.

The Old Way.

The New.

Illustration showing two men using an old-style acid pump, and one man using the new Nichols' self-acting acid pump.

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12 Warren St., N. Y.,
Importer of CHAINS, ANVILS, VISES, &c.
Agency of
HILL BROTHERS & CO., WALSALL, ENGLAND
GENERAL HARDWARE MERCHANTS,

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BALL'S PAT. SOLID STEEL SHEEP SHEARS.
These shears are unsurpassed for cheapness, dur-
ability and utility. They are made of one solid piece
of steel from point to point, and cannot be bent or
broken. They are at the junction of the shank
and blade. Samples can be seen at above address, or
sample lots furnished.



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CELEBRATED CUTLERY,

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F. & W. CLATWORTHY, Agents.

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in order to meet it, greatly extended their
Manufacturing Premises and Steam power.

To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear
their Corporate Mark.

Young's Patent Folding Scissors.



Having largely increased our facilities for the manu-
facture of these very popular goods, we offer them to
the trade at a large reduction from our former
prices. The list price of the large size is now \$1.00
per dozen, reduced by one-half, or \$0.50 per dozen,
formerly \$1.00. The material used in the manu-
facture of Young's Patent Folding Scissors is the
very best. All are nickel-plated and furnished with
a neat morocco case.

MARX BROS., Proprietors,
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All our SPOONS, FORKS, &c., are guaranteed to be plated upon

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THE MOST POPULAR PENS IN USE.
For Sale by all Stationers.
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WESTON DYNAMO-ELECTRIC MACHINE

NICKEL.

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We are furnishing outfitts specially adapted for Stove Work, giving a pure white deposit on plain or mat surfaces.

Outfits complete, with Dynamo-Electric Machine Tanks, Anodes, Solution, &c., \$250.

We beg to refer to the following Stove Manufacturers among 500 other houses using the Weston Machine: Richardson & Boynton, S. S. Jewett & Co., Fitter, Warren & Co., Perry & Co., Detroit Stove Works, Michigan Stove Co., Co-operative Stove Co., E. & C. Gurney, Hamilton & Toronto, and many others.

INFRINGEMENTS.

We call attention to infringements of the Weston Machine. Any Automatic Switches are used to prevent change of current. The Weston Co. are users by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

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One of the Best Selling Inventions in the Market.

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RULE GAUGE.


Having introduced my Rule Gauge, and finding to the wants of Carpenters and Mechanics, and is appreciated by them, the demand having already come into use all over the country, I am now prepared to supply the trade at a liberal discount.

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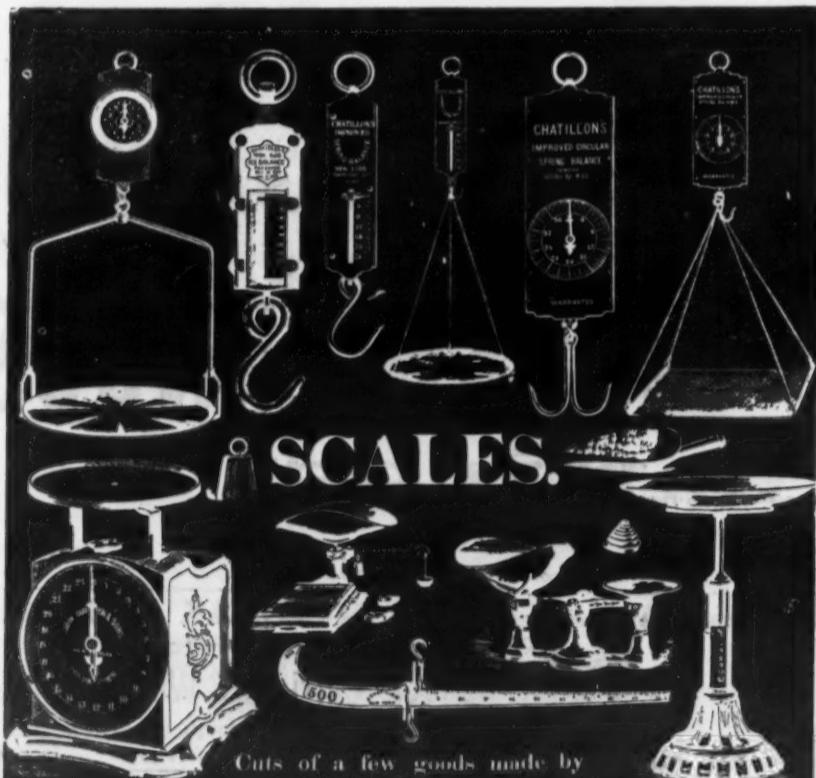
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HARDWARE & TOOL CO.

BEMIS & CALL SPRINGFIELD,
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MORE OTHERS GENUINE.

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Cuts of a few goods made by JOHN CHATILLON & SONS, NEW YORK, U.S.A.

"OLDEST" AND "LARGEST"

And only "Incorporated"

TILL COMPANY

In the World.

FAIRBANKS SCALE COMPANY,

WHOLESALE AGENTS.

Send for Price List and Circular.



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John Carver,
MANUFACTURER OF**CAULKING IRONS,**

Cotton, Freight and Hay Hooks,

No. 44 North Third Street,

Near First, BROOKLYN, N. Y.

ding furnaces, two heating furnaces, one 4000-pound steam hammer and two trains of rolls. Refined forge iron, and, as a specialty, iron for steel-making purposes, will be the product of this mill. The machinery, hammer and building have all been contracted for and are partly on the ground.

The Beaver Falls Novelty Works shipped 500 dozen coffee-mills to a firm in St. Louis recently.

Ihmson & Co. are building a large blacksmith shop at their glass works on Neville street, to afford better facilities for making pipes, tools, &c. The last two weeks is about the only time they have been running nightily since they started in June. The reason, as has been published, is briefly that the union would not permit the blowers to work. This threw the firm so far behind in their orders that they were threatened with legal proceedings by Western firms for not filling contracts. They are working along smoothly now, however.

At the Pittsburgh Forge and Iron Co., the bar, guide and puddle mills are all on double; three steam hammers are also working night and day in the forge, turning out over 100 axles in 24 hours.

At Lewis, Oliver & Phillips' all departments are on double turn.

Miller, Metcalf & Perkin, proprietors of the Crescent Steel Works, have opened a branch warehouse at No. 40 Dearborn street, Chicago.

Only two mills in this city are now using natural gas as fuel, though when the experiment was first made it was supposed that it would quite generally supersede coal.

WEST VIRGINIA.

The Wheeling Sunday Leader has the following: The Aeota Mills are running full time and turning out large orders of iron. Spence, Bragg & Co.'s foundry, at Martin's Ferry, is doing all the work that it is possible for them to do. Spence's Agricultural Works, at Martin's Ferry, have shut down for the summer, and will not resume before the 1st of November. The Moundsville Rolling Mill made a large shipment of cotton ties on the steamer Andes on her last trip down. The Laughlin Mills, at Martin's Ferry, shut down recently, but will resume shortly. The mills have lost but three days since they first started up.

The Benwood Mill is now on in all its departments.

ILLINOIS.

The Centralia Iron and Nail Works commenced to run the puddling department double turn, September 8th. Orders are coming in faster than they can be filled. They expect to run the puddle department double turn, to supply the factory with iron for two or three months, when they shall have more furnaces erected, so that they can supply them on single turn.

WISCONSIN.

The National Furnace, Depere, has blown out for repairs, which will be made as speedily as possible, and the stop will be of short duration.

KENTUCKY.

The Greenup Lime Works blew in week before last. They are now supplying limestone to the furnaces along the river. They sold a barge load to Ohio Furnace at 90 cents per ton on the barge recently.

The Pennsylvania Furnace was put in blast Wednesday last.

The Mt. Savage Furnace is about to blow out to put in a new hearth.

The Norton Iron Works are still running full time in all of their departments. The furnace is working well, making something near 50 tons of good No. 1 iron per 24 hours. The rolling mill, boiling and heating furnaces are all at work turning out near 500 tons of nail plate per week. The factory is cutting about 5,000 kegs of nails per week and shipping a great many kegs.

Charcoal at the rate of 30 loads per day is now coming in at Hunnewell Furnace.

MICHIGAN.

The Carp River Iron Company has taken a lease of the Ishpeming peat furnace, and will at once proceed to put it in condition to blow in. The stack will be lighted in the course of three months—just as soon as the necessary repairs can be made and a supply of fuel secured. The stack is 42 feet high, with bushes 9 feet in diameter, and there is no reason why, as a charcoal furnace, it cannot be made a paying concern. The coal will necessarily have to be brought from a distance, by rail, but its close proximity to the mines will offset that disadvantage in the saving of freights on the ore consumed.—*Marguerite Mining Journal*.

The Carp River Furnace was blown out week before last, after a run of 19 months on one hearth, during which time she made 8200 tons of iron, mostly No. 1, 2 and 3 grades. She is now receiving a new hearth and other necessary repairs, and will blow in again this week.

It is now pretty certain that the Lake Superior Company have in contemplation the starting up of the Grace Furnace, in this city, early next spring. It will not be leased to any one, but the intention is to make a stock dividend of the furnace property to the mine shareholders, and organize a new and distinct company, by which the furnace will be owned and operated.—*Marguerite Mining Journal*.

The Leland Iron Company, of Detroit, have purchased the charcoal blast furnace at Leland, formerly belonging to the Wyandotte Rolling Mill Company. Extensive improvements and repairs are being made by which the capacity of the furnace, which is to be blown in at the opening of navigation, will be increased.

WYOMING.

The Rocky Mountain Paint Company's mill and machinery at Rawlins, was destroyed by fire on the 10th instant. Loss, \$150,000.

The proprietors of the Westphalian and Silesian rolling mills for the manufacture of iron pipes, are reported to have signed a convention pledging themselves to a general advance of prices, which are for the future to be fixed by mutual arrangement.

The Valley Virginian reports the discovery, near the Elizabeth Furnace, of a 35-foot deposit of rich red hematite iron ore.

METALLURGICAL NOTES.

ON THE APPLICATION OF THE SPECTROSCOPE
TO THE ANALYSIS OF IRON AND STEEL.

Messrs. John Parry and Alex. E. Tucker, both eminent English metallurgical chemists, have contributed to *Engineering* a series of articles on the application of the spectroscope to the analysis of iron and steel, in which they give the results of a long and laborious series of experiments.

These, they claim, show that the spectroscope is able and destined to fill a gap in the means of research at the disposal of chemists in iron and steel works, and they hold out the hope that the spectroscope will aid in revealing the causes of diversity in physical properties which the ordinary chemical analysis fails to detect.

For producing the spectra, Messrs. Parry and Tucker used a 6-inch coil, the battery power for which was, after a number of experiments, obtained by using 12 large carbon zinc elements and 12 quartz Bunsen cells. Two induction coils were used. The spectroscope was an ordinary single prism instrument, with a telescope for fixing the position of any given line, the micrometer scale being illuminated with an electric lamp.

In the production of spark spectra, which were always photographed, Bunsen's carbon electrodes were used. For photographing, Swan's dry plates, with ferrous oxalate developer, were adopted after numerous trials. With this apparatus they took the spectrographs of a large number of metallic chlorides, and turning to iron they discovered that it is necessary to remove the greater part of the iron from the solution with which the electrode is saturated, in order to obtain spectra of the minute quantities of the impurities in the commercial products. In this way they obtained the spectrographs of chromium steel, of tool and Bessemer steel, of Swedish wire and Poorman iron, and comparing it with the characteristic lines of the main elements, arrived at the following results: Chrome steel showed the chromium lines and seemed deficient in manganese, while tool steel appeared to contain more calcium, and Swedish wire less calcium, than the others, while the Bessemer spectrograph exhibited aluminum lines. Messrs. Parry and Tucker have not, it seems, gone into the more directly practical question of selecting steels or irons of apparently equal chemical constitution, but having different physical properties, and of ascertaining by the spectroscope whether differences can be detected and to what they are due. Should they succeed in doing this—and it is perhaps saying little to state that there is some promise of their doing so—they will make an important addition to our present means of research, which in some cases so utterly desert us.

ASSAY OF ARGENTIFEROUS GALENA.

The usual methods of determining the silver in argentiferous galena are dry assays, the accuracy of which depends much upon the skill of the assayer. However careful he may be, certain losses both in scorification and cupeling are unavoidable, so that the assay is always favorable to the purchaser.

It is claimed in favor of these methods that they represent those to which they give rise fairly represent those of actual working. Of late, however, the opinion has been more and more gaining ground among metallurgists that it is a better plan to ascertain by correct chemical analysis the true amounts, and make allowances, &c., accordingly, as it gives those in charge a fuller and clearer idea of the actual sacrifices sustained by present working methods, and can alone serve as the basis of improvement. It is for this reason that volumetric methods of analysis, combining as they do accuracy and rapid execution, are received with much favor by the managers and chemists of metallurgical works. With the exception of the fine silver assay, little progress has been made in this direction in silver and lead smelting works, and it may be of interest, therefore, to give briefly the method proposed by Herr Balling in the *Oest. Zeitschr. für Berg u. Hütten Wesen*. His assay is an adaptation of Volhard's method, which we understand is successfully competing with Gay Lussac's fine silver assay in Germany. According to Balling, from two to five grains of the galena is very finely ground and intimately mixed in a porcelain mortar, with from three to four times its weight of a flux composed of equal parts of soda and saltpeter, placed in a porcelain crucible, covered, and, having been heated to thorough fusion, stirred with a glass rod. It is then allowed to cool, and afterward placed in an evaporating dish partly filled with water, where the melted matter is softened and dissolved out of the crucible into the dish, which is then heated and the watery solution is filtered into a flask. The residue on the filter is rinsed back into the dish, very dilute nitric acid is added, and the whole evaporated to dryness. The dry residue is taken up in water acidulated with nitric acid, heated, and filtered back into the flask with the watery solution. The residue is washed with hot water, the filtrate is allowed to cool in the flask, ferric sulphate or iron alum is added, and the liquid is titrated with a standard solution of sulphocyanide of potassium, by which the silver is precipitated as sulphocyanide, insoluble in acids. The least excess of the sulphocyanide of potassium is shown by the production of sulphocyanide of iron, which colors the liquid red.

The report that Colonel Thomas A. Scott has made financial arrangements in Europe which insure the completion of the Texas and Pacific Railroad will be welcome news in Northern Texas. Whether Colonel Scott intends to go beyond the Rio Grande is not stated, but he will have to do some pretty rapid construction work if he reaches that point before the road which Mr. Huntington is pushing eastward across Arizona and New Mexico. Probably the junction of the two roads will be at the river. The Texas and Pacific has been fairly successful as a local road, and has settled a large belt of country with a prosperous farming population. Its further progress westward will open new regions to emigrants, well adapted for wheat culture and stock-raising.

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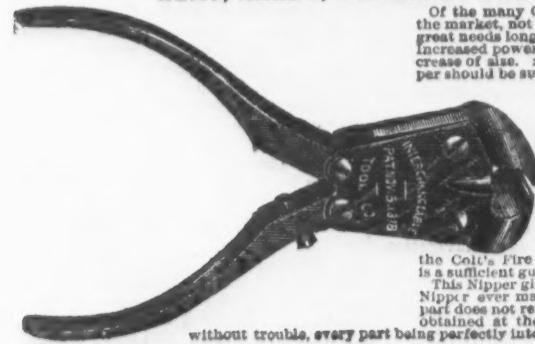
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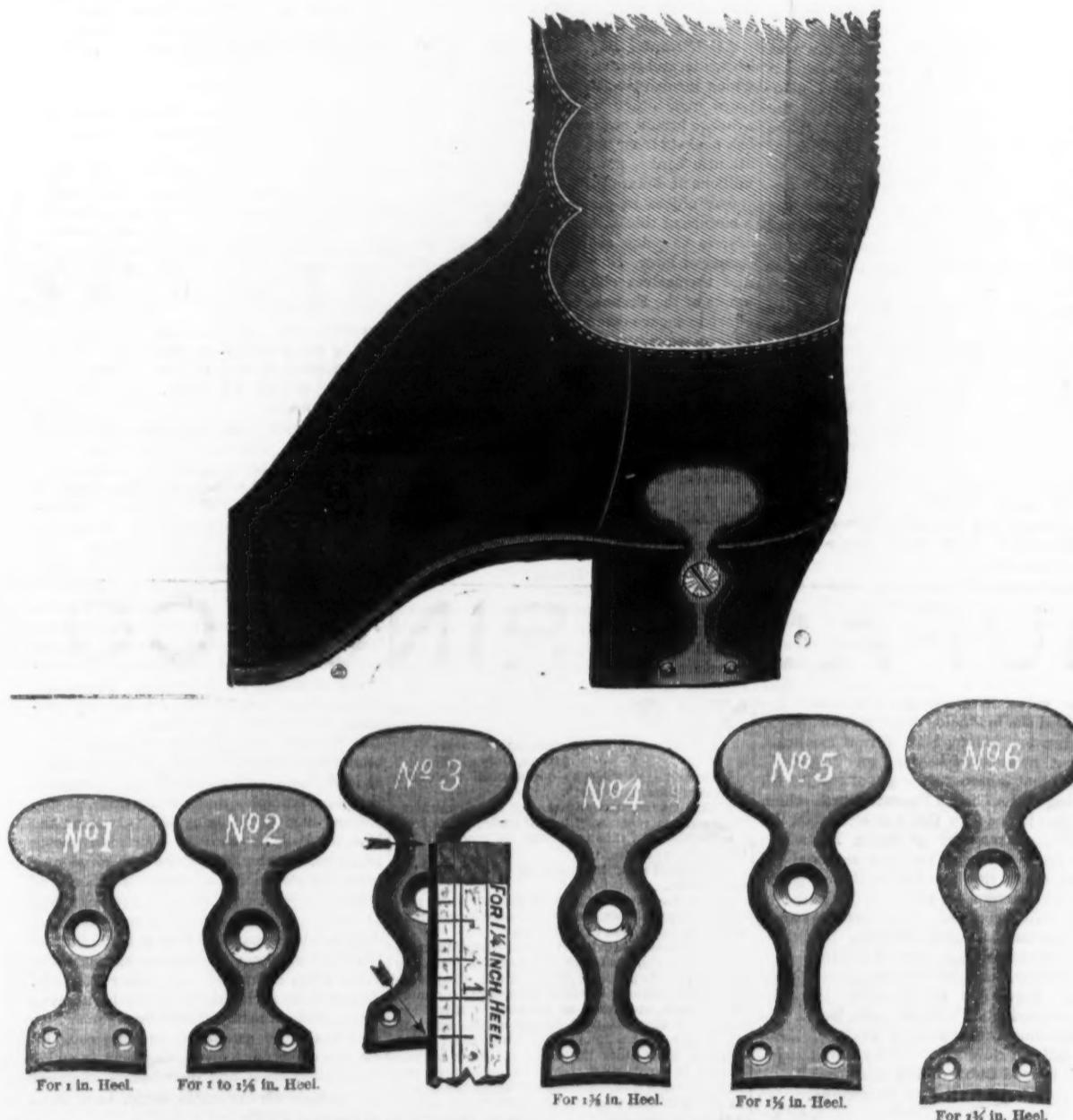
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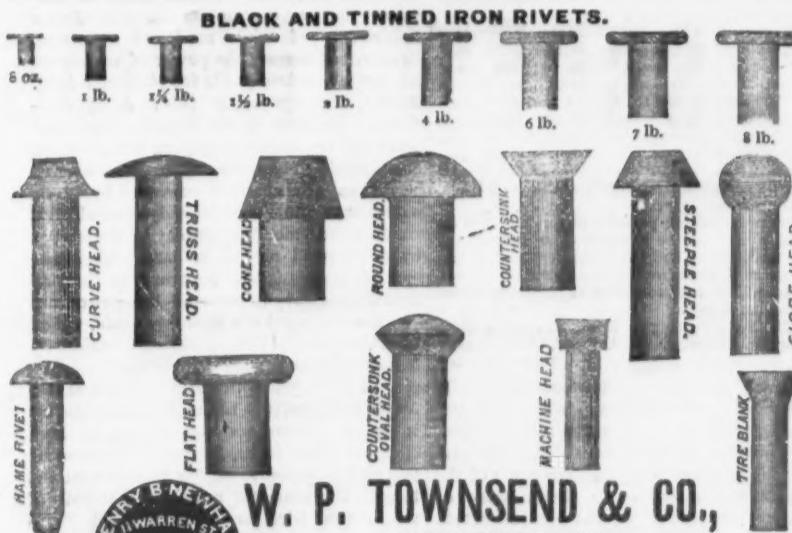
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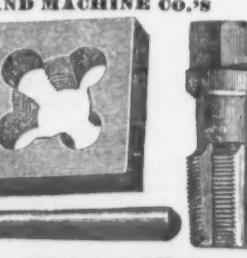
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LABOR AND WAGES.

On the 1st of September the manufacturers of window glass in Baltimore expected to resume, but were disappointed by reason of the refusal of the glass blowers to work for 10 per cent. advance upon the wages paid them in 1875. The blowers work by the piece and pay their assistants—boys, called gatherers—by the month, which last year was at the rate of \$40. These boys now claim \$45 per month, which the blowers say is more than they can afford to give unless their wages are increased 15 per cent. The net amount averaged by each blower is about \$18 per week, or \$75 per month, and they insist upon an increase of 15 per cent. in order to accede to the demand of the boys. It will be seen that the difference between the men and the manufacturers amounts to very little in dollars and cents, and it is probable that a settlement will be effected. There was a meeting of glass blowers last night at the hall over the old Bible House building, Fayette street, near Charles street, in secret session. A glass blower, who says he is not identified with those holding out, says that he thinks the blowers, many of them, belong to the Knights of Labor, which is a widely-spreading organization.

"Chancey Andrews, Niles, Ohio, is now paying the established price for boiling, \$5 per ton of 2240 pounds. The praise for the above is due to the helpers, as they compelled the boilers to get it." The above is the old, old story of the *Labor Tribune*. When any progress is made in the condition of the members of the Amalgamated Association of Iron and Steel Workers, all the praise and credit must be given to that organization. In this instance the helpers had nothing whatever to do with advancing the prices to the boilers in the Niles Iron Co. The facts are that in October, 1875, and after the above mill had been idle a long time, the workmen proposed that the proprietors give them steady employment, and agreed to work for a little less than the regular price which is established by the Amalgamated Association of Iron and Steel Workers. The proprietors agreeing to the proposition, promised them steady work at those prices, and as soon as the prices of finished iron should advance sufficiently, to pay them the regular prices for their labor. In accordance with this agreement and without the workmen asking for it, or in any way intimating that they desired or would ask for it, the proprietors, on the 5th of August, informed their workmen that, as there was better demand for iron and as prices had advanced, according to their agreement, they were prepared to commence paying them the regular established price for their labor. A better feeling now exists between employers and employees than at any time since the Niles Iron Co. have owned the works.

One of the most commendable moves on the part of the workingmen we have yet seen, has been made by the carpet-weavers of Philadelphia. They recently instituted measures for the formation of a joint association of carpet manufacturers and weavers, to protect the interests of both employers and employees, and establish a feeling of harmony and co-operation between them regarding the prices for labor, &c., in the future. If all the different trades could be induced to perfect similar organizations, we should hear no more of money and time wasted in strikes and lockouts. In the majority of cases strikes can be obviated by bringing about an understanding between employer and employee, which such organizations will promote naturally and easily. With direct intercourse between the manufacturer and his men, the power for mischief of the demagogues who arrogate to themselves the championship of the working classes will be greatly diminished if not entirely destroyed, and a disturbing element be rooted out. Better work will be done in the factory, and better pay be given. From every point of view, therefore, we think, this movement is a praiseworthy one, and it should be encouraged and further developed.

The difficulty between the Reading Hardware Company and their Molders has been settled by an increase of 15 per cent. for the present month, to be further increased to 25 per cent. on and after the 1st of October.

The *Labor Tribune* advises the St. Louis boilers to stand by the established rules—5 heats double turn, 6 heats single turn, and not more than 10 heats in 24 hours under any circumstances.

The window glass blowers in Johnson & Co.'s works, Philadelphia, established the card price for blowing and gathering for the ensuing year, which was an increase of 10 per cent. over last year's wages. The gatherers last year and for many years past have been getting 55 per cent. of the blowers' wages. The price fixed for the gatherers on the 1st of August was 60 per cent. of the blowers', which is an advance of more than 15 per cent. over last year's wages. This tariff was taken before the manufacturers by the president of the union and was agreed to by all. This list was to have taken effect September 1, but as Messrs. Johnson & Co. had been in operation for some time, it was decided that the date for the inauguration of the new list should be August 15, in order to take in the above firm, although it may appear that Messrs. Johnson & Co. independently advanced the blowers' wages, owing to the fact that no other window glass factory is now running nor has been for the past few months. They are now paying the price which would be uniform throughout the country next year. The reason that the works of Messrs. Johnson & Co. were the only ones that were running June and July was that the Glass Manufacturers' Association passed resolutions in January last restricting the production to 10 months this year, so that between June 15 and August 15 each establishment was obliged to suspend for 60 days. Moreover, the blowers' union passed resolutions that they would not work during July and August, so that none of the manufacturers could run during the time named even if they desired to. Messrs. Johnson & Co. were not running last year, and they are not members of the National Association. This is the only firm in Pittsburgh not members of the association. Mr. Johnson has been engaged in the window glass business for over 30 years, and it was altogether an act of good will on the part of the blowers' union in permitting their men to work in his factory. In view of the increased demand for window glass, some of the Eastern and Western firms would have started up if they could have gotten men to work, but they were unable to do this, as the union men would not go back on their word.

The strike of molders in the employ of Carr, Crowley & Devlin, malleable and gray iron workers, Philadelphia, ended on the 13th inst., by the employers granting the advance of $\frac{1}{4}$ to $\frac{1}{2}$ cents per mold demanded by the molders.

The *Reading Eagle* says: The iron business about Lebanon is picking up. The Weimers want molders and machinists, and have employment for at least 50 more men, and they find skilled help very scarce.

Notices were posted on the 13th inst. in the Kensington, Philadelphia, Mills announcing a general increase of wages equal to about 6½ per cent. for all hands. This is the second advance within three months, the first being 10 per cent. The most significant feature of these advances lies in the fact that both were granted without any solicitation on the part of the workmen.

A strike of molders was inaugurated at the Ohio Falls Car Works, at Jeffersonville, Ind., on the 9th inst. At present only the freight department of the extensive establishment is involved. On the 8th the molders, through a committee, sent a communication to the officers of the company, asking that the price paid for molding street-car wheels be increased, and that the wages of the side-floor molders be raised from \$2 per day to \$2.25. The committee were requested to call again, by which time the officers would be ready to reply. At a second meeting, the request of wheel molders, being considered reasonable, was complied with. In the matter of the wages of the molders on the side floor, the company made a proposal that the superintendent of the works and one of the molders, to be elected by his comrades, should visit all the prominent car shops in Ohio, Indiana and Illinois, and ascertain the wages paid for similar work in those shops; that the average price found to prevail would be paid to the molders of the Ohio Falls Company, and that any change resulting from the investigation should date from September 10th. The committee reported this proposition to the molders, but they left the shop in a body without making any reply to the proposition of the officers of the company. As it was impossible to run the freight department without the foundry, it was closed, thus adding to the number of idle men. A few men were retained, to complete so much of the work as castings had been made for. The passenger shops are not affected. On the 12th the company paid off all the molders.

A general convention of miners of Western Pennsylvania will be held in Pittsburgh on Wednesday, September 24th, to consider some method for arbitration, and to establish a basis of wages. Some of the operators are anxious to confer with the miners, and the convention will appoint a conference committee to meet a similar committee of operators on Thursday, September 25th.

The white coal heavers employed by a Chicago firm struck because 50 negroes were put to work with them.

Nearly 500 miners at Mineville, N. Y., near Port Henry, went out on a strike on the 8th inst. and demanded 50 cents per day advance. Everything is quiet thus far.

The Indianapolis Rolling Mill Company, Ind., advanced the wages of men working by the ton on September 1st over 10 per cent. Some of them were dissatisfied and kept the mill from work three weeks. The company then put in new men in place of the dissatisfied ones, and they are now running smoothly night and day.

Displays at the Cincinnati Exposition.—The Cincinnati Exposition, since its opening on the 10th instant, has had a daily increase of visitors. All the railroads leading to the city are bringing in full trains of passengers at very reduced round-trip rates. Many new articles of manufacture in which iron and steel are chiefly employed are on exhibition, and the various departments, machinery, hardware specialties, stoves, stoneware, as well as iron ores, pig and bar iron and agricultural steels and irons, being fully represented.

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New Gold Fields in Tasmania.—New gold fields have been discovered in Tasmania. At least so says the *Melbourne Argus*, on the authority of its Launceston correspondent, who announces the advent in his city of a man with 70 ounces of gold, obtained on the Pieman River, west coast of Tasmania, and the prompt departure from Launceston of a large number of diggers, bound for the new workings. These men have embarked in a coasting steamer which will convey them to Pieman River, whence they tramp it for 70 miles through the bush to the locality that has proved so productive of the precious metal. A vessel named the Little Maud, which arrived at Circular Head on the 23d of last May, brought the news that a party of three men were "realizing" an ounce and a half of gold per diem at the new diggings. This intelligence naturally caused considerable excitement in Melbourne, whence it appears to have been telegraphed to all parts of the Australian Continent. The population of Tasmania may be expected to increase with extraordinary rapidity should further exploration and experiment confirm the statements of the lucky diggers who have already come into Launceston with their treasure.

The Iron Age

AND

Metallurgical Review.

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CONTENTS.

First Page.—Thompson's Pulverizing and Sifting Mill. Scientific and Technical.

Third Page.—The Fire Risk of Steam Heating. Railway Accidents in England During 1878.

Fifth Page.—The War of the Telephone. The Tube Trade in England and the German Tariff.

Seventh Page.—Double Compound Lever Cutting Nippers. New Steamship Line to Great Britain. A Large German Iron and Steel Works. England's Trade with America.

Ninth Page.—Industrial Items.

Eleventh Page.—Industrial Items (Concluded). Metallurgical Notes.

Thirteenth Page.—Labor and Wages. Displays at the Centennial Exposition. New Gold Fields in Tasmania.

Fourteenth Page.—Conditions Affecting the Advance in Iron in the West. British Banks at Home and Abroad. The Taxation of Commercial Travelers in Texas. Electricity for the Transmission of Power and Generation of Heat.

Fifteenth Page.—New Publications. Mississippi Navigation. Report of the United States Testing Board on the Properties of Wrought Iron and of Chain Cables. A Remarkable Repeating Rifle. English Rails and Axles in 1878.

Sixteenth Page.—Fusible Alloys and their Uses. The Future of the Anthracite Coal Fields.

Seventeenth Page.—Trade Report. General Hardware.

Eighteenth Page.—Hardware (Concluded). Iron, Metals.

Nineteenth Page.—Exports. Imports. Coal. Old Metals. Paper Stock, etc. Philadelphia. Pittsburgh. Chattanooga.

Twenty-first Page.—Boston. Cincinnati. Baltimore. Louisville. St. Louis. Our English Letter.

Twenty-second Page.—Foreign. Mining and Mineral Items.

Twenty-third Page.—The Iron Age Directory.

Twenty-sixth Page.—New York Wholesale Prices.

Twenty-seventh Page.—New York Wholesale Prices (Concluded).

Thirty-first Page.—Philadelphia, Buffalo, Chicago and Pittsburgh Hardware and Metal Prices.

Thirty-third Page.—Boston and St. Louis Hardware and Metal Prices.

The death is announced by cable of Bernhard Von Cotta, an eminent mining engineer and geologist, whose writings have made him familiar to the general public as well as to the profession. Many who now rank high as mining engineers in this country, have been guided in their first studies by Professor von Cotta, who for a whole generation taught at the famous Freiberg School of Mines. He was born on the 24th of October, 1808, in Thuringia; entered the School of Mines as a student in 1827, and was appointed a professor in 1842. Besides long and faithful work as an instructor, Cotta was active in the field. He explored and examined, in connection with the famous mineralogist Naumann, the geology of his native country, Saxony, as a prominent member of the Royal survey, and he contributed largely to the mapping work connected with it. As a careful and original investigator, he added much to the rapidly accumulating store of geological knowledge, and some of his best efforts were devoted to a wide dissemination of the results of contemporaneous research in this field. It is this portion of his labors that has made his name

well known among the educated classes in Germany. The grace and ease of his style made his books attractive, and rendered him pre-eminently able to popularize geological truths and theories. Some of his works have been translated, and have met with deserved success. His standard book: "Treatise on Ore Deposits," which has been made accessible by Prof. Prime's translation, may serve as a good example of the industry, originality and conscientiousness which he brought to bear upon all matters that he undertook. The Freiberg School has lost in him one of the veterans whose fame attracted students from all parts of the globe, and if we are to believe recent reports, the increased excellence of our own colleges, and the declining fame of the renowned German academy, is telling seriously upon the numbers who go abroad to study the first principles of mining and metallurgy.

Conditions Affecting the Advance in Iron in the West.

If the West was laggard in taking advantage of the situation to advance prices on merchant iron, it certainly cannot be charged with any slowness in this respect since it has started in earnest. Within three weeks the card rate on iron has advanced $\frac{1}{2}$ cent per pound, or \$10 a net ton. The first advance to 2.30 cents from 2 cents was informal, and the result of a general belief that the market would bear it. The advance to 2.50 cents was made by the Western Iron Association at its meeting on August 28th. Of course, the selling price for large lots is somewhat below this, but it is true that some sales, in cases where the iron must be had at once, have been made at only one-tenth off. Another good indication is that the card of extras is being adhered to. There is none of that cutting of classification that has been so common in the past five years. No doubt an order for all extras could be placed a little lower than one for all bars, but it would not be by a cutting off of the classification. It would be sold on a given basis all round.

The preliminary slowness and the very rapid advance since it began, while at first blush they may seem surprising, will not be so if the peculiarities of the Western market are remembered. Its market for raw materials—ore especially—is fixed in the spring for the whole year. Drawing its supplies from Lake Superior, those supplies are brought to the lower lakes in the summer months and piled on the docks, though the shipments from the docks may continue the whole year. The ore companies have pursued the policy of bringing down only what was contracted for. The prices are fixed for this early in the season. Now, any advance in the market for merchant iron early this year would have unsettled and probably stiffened the ore market more than it was advanced; and, consciously or unconsciously, the Western manufacturers fought against this. Now that virtually all the ore that can be contracted for has been bought, there is nothing to be gained by retarding the advance of the merchant iron market.

A somewhat similar state of affairs rules in the pig-iron market. Most of the large Western mills have considerable stocks of pig on hand or contracts out. They opposed any advance until they had bought their stocks. Now that they are bought, they stand aside and allow the advance.

The labor question has been an element on the bear side of the market. Prices are fixed on the 1st of June for a year. Had iron begun to advance the middle of May as it did the middle of June, the settlement of prices for the coming year would have been a more difficult subject than it proved to be.

There is some difference of opinion as to the future of prices. The best informed of the Western manufacturers are not inclined to advance the card beyond \$2.50. Several reasons guide them in this determination. In the first place, in view of what orders are already booked, it is not believed that the market will stand above \$2.50, and any attempt to put it above this will hurt the market. So far, every advance that has been made has been maintained, and it would be very harmful to get a setback. Another reason is that an advance above \$2.50 would unsettle wages. These are for skilled labor on a basis of \$2.50 card. An advance above this, if it was not sustained, would compel the manufacturers either to reduce their card or to continue paying wages on a higher basis, either of which would be injurious. There seems an inclination, for these reasons, to keep iron at \$2.50 card. Of course, if it can safely be advanced beyond this, it will be, for if iron will bring \$2.75 or \$3, the manufacturers can afford to pay the advanced wages that will be demanded.

The great tin-plate trade of Wales, which has been struggling hard against adversity for a number of years, is threatened, in at least one of its branches, with a serious competition. The low price of mild steel and its superior quality are now, it seems, commencing to make inroads upon the territory of the higher classes of charcoal tin plates. We have recently examined tin plate made of mild steel, which showed it to be equal, if not superior, to the very best quality produced in Wales. The plate was doubled up and hammered on an iron anvil as close as it was possible to fold the plate, without showing

any signs of distress where bent. We understand that this material has been used for stamping, and has given as much satisfaction as the best charcoal plate.

British Banks at Home and Abroad.

One of the greatest factors in facilitating the immense foreign trade of England, is the banking machinery centering in the metropolis and spreading to the remotest quarters of the globe. Banks were introduced in England much later than on the Continent. In Northern Italy they existed as early as the Crusades; in Holland they were founded between 1607 and 1635; in England the first bank, that of Child & Co., still doing business, came into existence in 1663, the Bank of England 1694, that of Scotland 1695, the Royal Bank of Scotland 1727, and the Bank of Ireland 1783.

Up to the year 1833 no large bank on shore was allowed to be founded in London or within a circuit of 65 miles of it, the Bank of England enjoying this exclusive privilege. In 1833 this privilege was taken away from the Bank of England, but it was allowed to retain the exclusive privilege of issuing notes to bearer within the said circuit. The immediate effect of this law was the founding of joint stock banks in London and vicinity. In 1844 Sir Robert Peel introduced some further reforms, limiting the amount of issue of bank notes to bearer, the same limit being applied to the Bank of England, but the latter retaining the exclusive privilege of issue within the said circuit. In 1862 the limited liability act was passed, limiting the liability of directors and shareholders, if desired, to the amount of capital subscribed and the amount of notes to bearer issued.

Every such reform was followed by an increase of banks established, not only in England, but in Scotland and Ireland. In 1872 the joint resources of banks in the United Kingdom amounted to the enormous sum of \$3,080,000,000. In February last the English banks alone held deposits to the amount of \$2,000,000,000; in April the Bank of England held \$191,200,000. May 1 it was estimated that the joint resources of English banks and the savings banks in Great Britain and the colonies, represented \$4,200,000,000. That under cover of this colossal increase a great deal of corrupt banking should gradually have grown up in some localities, need surprise nobody; and the failure of the City of Glasgow Bank, the Caledonian Bank Company and others, revealed this recently. Accommodation had been stretched to the utmost, the decline in the value of mines and real estate depreciated the intrinsic value of mortgages, and disaster followed in a few localities, without, however, spreading any further.

The great inherent strength of the British banking system lies in the safeguards which surround it, and in the magnitude of the joint deposits made by the people. It furthermore lies in the vigor and ever renewed influx of capital flowing into the British banks from all quarters, by virtue of an immense trade, embracing the commercial transactions not only of Great Britain, but ninetenths of the foreign trade of all other civilized nations, the bills drawn abroad being easiest negotiable on London. Thus the bulk of products we draw from Brazil and the extreme East is paid by drafts on London, bills on New York hardly being negotiable beyond Cuba and Venezuela. To be thus tributary to the English necessarily involves commissions and other profits, all accruing to them alone. Nor is there much of a prospect that the world will emancipate itself from the English banking system within this century, the machinery being too complete and apparently suiting all merchants and bankers, if we except the French, who are now making a strenuous effort to cut loose from it. We Americans have not begun to do so, despite the large banking capital concentrated at New York and Boston. In this movement, to substitute Paris for London, at least so far as French transatlantic trade is concerned, France is mainly represented by the following Parisian banks:

Société générale.....	\$34,000,000
Dépôts et Comptes Courants.....	16,000,000
Société financière.....	24,000,000
Comptoir d'escompte.....	16,000,000
Credit Lyonnais.....	30,000,000
Total.....	\$100,000,000

The English banking system beyond the seas may be summed up as follows:

FOREIGN AND BRITISH COLONIAL JOINT STOCK BANKS.

I.—Banks of India and China.

Leading banks.	Branches.	Capital and Reserves.
Central Bank Corporation.....	18	\$10,000,000
Agra Bank.....	8	\$5,000,000
Madras Bank.....	India, China, and London.....	4,400,000
Chartered Bank of India, Australia and China.....	15	4,400,000
Delhi and London Bank.....	4	2,000,000
Hong Kong and Shanghai Banking Corporation.....	16	8,300,000
National Bank of India.....	2	5,000,000

Seven banks with.....

II.—Banks of Australasia and British North America.

III.—Banks in Non-Colonial Countries and in Africa.

Leading banks.

Australian Joint Stock Bank.....

Bank of Australia.....

Union Bank of Australia.....

National Bank of Australia.....

Bank of New South Wales.....

Bank of Victoria.....

Bank of British North America.....

Bank of Montreal.....

Merchants' Bank of Canada.....

Commercial Banking Co., Sydney.....

Eleven banks with.....

IV.—Banks in Mexico and South America.

Leading banks.

Bank of Rio de Janeiro.....

men who reason calmly. He disposes in the most summary and unwarranted way of the question of economy, by generally assuming that the cost of lighting, of producing motive power, of heating metals and the houses of Sheffield should all and singly be "halved." By this simple and expeditious method he arrives at the dazzling result that Sheffield would save \$2,000,000 per annum. We are unwilling to follow Prof. Ayrton in his discussion of the other advantages which, according to him, would accrue to the grimy city by the introduction of electricity for a variety of uses. We would take this occasion to protest against any such loose figuring as that by which he has marred, and perhaps destroyed, work that might otherwise be beneficial. A repetition of the experiences had with the electric light is not desirable. The time for generalities has passed, and the public now look forward to facts and figures based upon well-conducted experiments.

NEW PUBLICATIONS.

Mr. Geo. H. Frost, the proprietor of *Engineering News*, is just bringing out a work which will be of great interest to all who have anything to do with the steam engine. The work is entitled "A Practical Treatise on the Steam Engine," by Arthur Rigg, M. E., with additions showing the latest and best American practice. This work has a high reputation upon the other side of the Atlantic. It will be remembered that Mr. Rigg prepared a great proportion of the Centennial reports upon steam engineering, which were published in *Engineering*. His writings upon this subject have been of the highest value. The scope of the work will only include fixed engines, no attention being paid to the larger departments of locomotive and marine engines. The original treatise is very exhaustive, and examples of all the types of the best modern practice are given; but in order to render the work still more complete, a large amount of new matter relating to the latest and best American practice will be inserted, together with detailed drawings of engines, &c. It is the intention of the publisher to present to manufacturers the most practical treatise upon the steam engine that has yet appeared in the English language. The work in its enlarged and improved form will appear in the columns of *Engineering News*, the first number being published in the issue of Sept. 13. When completed it will be issued in book form. We are very glad that this work has been undertaken by Mr. Frost. Just such a book has long been needed, and the high price of the English edition (\$17) has entirely shut it out from circulation in this country. In the serial form, as it appears from week to week, it will cost only \$3. The price bound, we think, has not yet been announced.

SCIENTIFIC HORSESHOEING. By William Russell. Robert Clarke & Co., Cincinnati. Price \$1.
Mr. Russell, who, it appears, is a practicing farrier of much experience and success, has in the book before us carefully gone into the scientific and practical details of his trade. He minutely examines the anatomy of the hoof of the horse in its normal condition, and in the many forms of disease and crippling to which it is liable. He seeks the causes, suggests the preventives and points out the cures which he has had occasion to learn and to test by long experience. To that large branch of the iron trade, the manufacturers and dealers in horse shoes, his treatise will be valuable and probably suggestive.

Mississippi Navigation.

Contracts have recently been signed for the construction of several fast mail steamers to ply on the Mississippi River between St. Louis and New Orleans. It is probable that the former city furnishes the capital for building these steamers, and the near future is likely to afford abundant opportunity for further investments of a similar character. Capt. Eads' work at the mouth of the Mississippi has, as is claimed, supplied a permanent channel deep enough for the largest vessels engaged in ocean commerce, the demand for transportation services upon that river must soon be very great, quite surpassing what is required for the present traffic.

To Committee D, "On Chain and Wire Ropes," with instructions "to determine the character of iron best adapted for chain cables, the best form and proportions of link, and the qualities of metal used in the manufacture of iron and steel wire rope."

To Committee H, "On Iron, Malleable," with instructions "to examine and report upon the mechanical and physical properties of wrought iron."

To Committee M, "On Reheating and Rolling," with instructions "to examine and report upon the effects of reheating and rolling, or otherwise of reworking, of hammering, as compared with rolling, and of annealing the metals."

The work thus assigned to three different committees was of such a nature that it was considered advisable, in order to economize time, labor and means, by the avoidance of duplication of expensive experiments, to consolidate the committees and to conduct the investigations in such a manner that a single report would cover the whole ground. In thus concentrating the work, it was necessary that a leading object should be selected, and it was considered that the research which would be required to establish the characteristics of iron which would prove best adapted for the manufacture of cables, would furnish data which would bear more or less upon the subjects to be investigated by Committees H and M, while it would be quite practicable to select from the wide field presented by "wrought iron," and differences in methods of treating it, any number of lines of research, none of which would prove of much service in establishing points in regard to chain-iron experiments; therefore, have all been carried out so that while to obtain data, both as to the mechanical and physical properties of wrought iron, and as to the effects of different methods of treatment of the raw material, all have been made to contribute their quota toward the establishment of methods by which an iron could be judged correctly as to its adaptability for chain cable manufacture.

The cable-link is but a modification of the round rolled bar, and its qualities must depend upon those of the bar from which it is made. Therefore, we have selected the round bar as the foundation of our work, and our endeavor has been to ascertain what qualities should be inherent in it, and which would remain without deterioration through various processes incident to the manufacture from it of finished products of other forms.

A Nation Without Iron.—Mr. A. Woelk, in a narrative of his travels in Yucatan and the southeastern states of Mexico, pub-

lished in Peterman's *Mittheilungen*, introduces us to a so-called "civilized" people, who are practically unacquainted with the uses of iron. Writing about the northern portion of the State of Chiapas, he says that the inhabitants employ iron only in the shape of axes and machetes, which are imported from the United States. For the distance of 100 kilometers round about Palenque not one blacksmith is to be found. Not a single nail is to be seen in their houses; everything is held together with cords or with vines. Even in the preparation of their usual article of food—tortillas—the apparatus they employ is equally primitive, though in this respect they follow the custom which is universal throughout all Mexico and Central America. The grains of maize are crushed between two stones, one of which, the nether one, is rather large, with a sloping upper surface. A woman kneels by this stone and strews upon it some grains of maize, over which she works to and fro another stone of cylindrical form, so grinding the maize. The coarse meal so obtained is baked into flat tortilla-cakes in the ashes. This is exactly the mode of preparing meal in vogue in Central and South Africa; the African negroes, however, show higher grade of culture, inasmuch as they understand the working of iron. Our author caustically remarks hereupon that "the introduction even of hand-mills would be, for this country, a step of progress of far more value than many a high-sounding political prerogative, which can never be of any advantage to a population living in so low a grade of civilization."

Report of the United States Testing Board on the Properties of Wrought Iron and of Chain Cables.

A volume has recently been issued by the government printing office (45th Congress, 2d session, H. R. Ex. Doc. No. 98) containing the first installment of the reports of the United States Board appointed to test iron, steel, &c. It contains two reports: First, that of the three committees of the Board on chain cables, on malleable iron, and on reheating and rerolling wrought iron; and second, that of the committee on metallic alloys, containing an account of only a portion of its work, viz.: that upon the copper-tin alloys. Both of these reports are destined to become standard works of reference upon the subjects of which they treat. Although the board has had such a short life—less than three years—and although not a single test was ever made on the testing machine built for it, it has given to the world the results of the most extensive and satisfactory research upon the mechanical properties of wrought iron and of the copper-tin alloys that has ever been made.

But a limited number of copies of the volume have been printed by the government, and it will not be accessible to the great majority of manufacturers, engineers and others who will be most interested in its contents. We have, therefore, prepared careful abstracts of these reports, the first portion of which we begin below. Care has been taken to include in these condensations all the valuable conclusions, with all necessary information in regard to the character of the experiments made, while nearly all the tables of figures and less important details have been omitted, so as to bring the reports into the smallest compass. The exact language of the reports has been used, except in some sentences in which the abridgments made necessary a few unimportant changes.

REPORT OF THE RESULTS OF INVESTIGATIONS MADE BY COMMITTEES D, H AND M OF THE UNITED STATES BOARD APPOINTED TO TEST IRON, STEEL AND OTHER METALS.

The investigations assigned to the three committees designated by the letters D, H and M, were as follows:

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THE BAR.

Our plan of investigation was to first ascertain, by means of tension-tests made upon bars of such iron as we could procure, the amount of strength, elasticity, &c., which would be found to exist in ordinary American bar iron; next by tests by impact upon the same irons, to ascertain their relative power to resist sudden strain; and finally, having ascertained these essential points in the material, to make from each iron a number of cable-links, and by tension to find their strength and uniformity and the degree of dependence to be placed upon the wands.

To carry out these investigations, we procured bars of round iron of sizes such as are usually used in the manufacture of cables, viz., from 2-inch diameter to 1 inch, from the following manufacturers and dealers: Burden & Sons, of New York; Benton, of Pennsylvania; Burgess, of Ohio; Catasauqua, of Pennsylvania; New Jersey Iron and Steel Company, of New Jersey; Niles Iron Company, of Ohio; Phoenix, of Pennsylvania; Pemberton, of Massachusetts; Pencoyd, of Pennsylvania; Tredegar, of Virginia; Trego & Thompson, of Maryland; Sligo, of Pennsylvania; Tamaqua, of Pennsylvania; Wyeth Brothers, of Maryland, and many other bars of unknown origin.

The experiments upon the results of which our report is based comprise the details of all physical phenomena observed by us while testing to destruction nearly 2000 bar test-pieces, by the strain of tension, over 1500 by the strain of percussion, and nearly 500 cable links made in all respects as for service.

The tension-tests upon bars were made both upon bars in their normal condition and upon others from which a portion of the surface had been turned away. Those by impact were made upon portions of the same bars which had been tested by tension, and those upon chan-links from other portions of the same bars.

ACTUAL STRENGTH, AND STRENGTH AND ELASTIC LIMIT, PER SQUARE INCH OF 959 BARS OF ROUND IRON.

In the following table the stresses by tension required to rupture many of the bars we have tested are arranged in their relative order, the greatest stress required being given precedence upon each size.

In the columns where stress is reduced to the square inch, the area corresponding to the actual diameter of the bars has been used. This gives a more correct estimate of the relative order of tenacity than the first column, in which bars frequently gain or lose in precedence on account of excess or lack of material, some being rolled "full" and others "scant."

In the column "Standard for size," the strength we have found best adapted for cable iron is placed for comparison.

The elastic limit as given is not from perfectly accurate data; it is simply the amount of stress which produced the first perceptible change of form divided by the bar's area.

CONDENSED TABLE.

Size of Bar, Inch.	No. of Tests	Strength.		Elastic limit, per cent. of pile.	Standard for size, Lbs.
		Original Area, Lbs.	Per sq. in.		
4	1	2,920	59,885	.....	.....
4	5	5,886	54,000	40,980	.....
3 1/2	33	From 10,319 to 17,644	54,700 to 57,050	.....	.....
3 1/2	26	15,928	52,500	.....	.....
3 1/2	4	22,461	51,456	35,933	.....
3 1/2	49	From 48,480 to 61,727	51,350 to 59,230	43,665	.....
3 1/2	37	From 40,302 to 47,060	51,400 to 56,400	54,461	.....
3 1/2	14	72,960	50,400	27,781	65,974
3 1/2	9	61,420	50,040	27,583	.....
3 1/2	1	61,420	50,040	27,583	27,133
3 1/2	46	From 62,867 to 72,420	50,567 to 53,540	27,580	27,133
3 1/2	10	89,320	53,345	32,655	25,339
3 1/2	215	From 110,020 to 119,200	53,345 to 53,540	32,652	25,339
3 1/2	54	101,700	50,050	27,095	17,040
3 1/2	9	111,490	49,831	33,145	114,770
3 1/2	41	From 120,300 to 127,600	57,874 to 65,754	32,745	27,133
3 1/2	9	120,300	57,874	32,745	27,133
3 1/2	13	120,300	57,874	32,745	27,133
3 1/2	36	From 120,000 to 126,700	57,874 to 65,754	32,745	27,133
3 1/2	4	120,000	57,874	32,745	148,137
3 1/2	47	From 140,860 to 171,200	50,213 to 57,874	32,745	157,080
2 1/2	2	171,200	49,429	32,745	157,080
2 1/2	9	171,200	49,429	32,745	157,080
2 1/2	36	From 181,600 to 202,400	49,429 to 57,874	32,745	157,080
2 1/2	11	181,600	49,429	32,745	157,080
2 1/2	7	181,600	49,429	32,745	157,080
2 1/2	3	275,889	56,533	32,745	157,080
2 1/2	3	327,623	56,400	32,745	157,080
2 1/2	3	390,019	47,014	24,931	157,080
2 1/2	3	452,103	47,014	24,931	157,080
2 1/2	3	513,123	47,014	24,931	157,080
2 1/2	3	582,100	46,322	23,430	157,080

INVESTIGATION OF THE EFFECT OF DIFFERENCES IN THE AMOUNT OF REDUCTION BY THE ROLLS.

In procuring material upon which to make tests by tension, both in the bar and link form, our custom was to purchase from manufacturers at least one bar of each size ordinarily used in chain cables. Testing these bars in their normal condition by tension, it became evident that the strength of the different sizes was not in proportion to their areas; but that, on the contrary, there existed a variation in proportional strength which was in accord with variations in the diameter of the bars. In general terms it was found that as the diameter of the bar became less, the strength per square inch increased; but in comparing the results obtained from a number of such sets of bars, it became evident that the increase of strength from between the two extremes of say, 2-inch and 1-inch, was not created by a series of uniform steps upon each successive reduction, but that there was one point in the reductions where a decrease took the place of the usual increase, and that from this point the increase again began, and generally by more rapid steps. Thus the 2-inch bar was of less strength than the 1 1/2-inch; the 1 1/2-inch, than the 1-inch, and sometimes the 1-inch, being each of increased strength in the order given.

Fusible Alloys and their Uses.—The name "fusible metal" or "fusible alloy" is given to a mixture of metals which becomes liquid at temperatures at or below the boiling point of water. There are several such mixtures known, some of which are as follows: 1. D'Arcet's: Bismuth, 8; lead, 5; tin, 3 parts. This melts below 212° F. 2. Walker's: Bismuth, 8; tin, 4; lead, 5 parts; antimony, 1 part. The metals should be repeatedly melted and poured into drops until they can be well mixed previous to fusing them together. 3. Onion's: Lead, 3; tin, 2; bismuth, 5 parts. Melts at 197° F. 4. If to the latter, after removing it from the fire, one part of warm quicksilver be added, it will remain liquid at 170° F., and become a firm solid only at 190° F. 5. Another: Bismuth, 2; lead, 5; tin, 3 parts. Melts in boiling water. Nos. 1, 2, 3 and 5 are used to make toy-spoons to surprise children by their melting in hot liquors. A little mercury (as in 4) may be added to lower their melting points. Nos. 1 and 2 are specially adapted for making electrotype molds. French electrotype molds are made with the alloys No. 2. These alloys are also used to form pencils for writing, also as metal baths in the laboratory, or for soft soldering joints. No. 4 is also used for anatomical injections. Higher temperatures for metal baths in the laboratories may be obtained by the following mixtures: 1 part tin and 2 parts lead melt at 441.5° F.; 1 part tin and 1 part lead melt at 377.5° F.; 2 parts tin and 1 part lead melt at 340° F.; 63 parts tin and 37 parts lead melt at 344.7° F.

The Future of the Anthracite Coal Fields.—Mr. P. W. Shearer, of Pottsville, Pa., in a paper read before the American Association, called attention to the waste in anthracite mining and marketing. The work of mining anthracite coal was begun in 1820 with 365 tons; now 20,000,000 tons per annum are produced. Mr. Shearer asserted that only one third of the coal goes into consumption; two-thirds are wasted, lost in the mines and in preparation. He put the maximum product at about 50,000,000 tons per annum, and at the present rate of increase this limit will be reached in the year 1900, and in 186 years, say in the year 2065, our anthracite coal fields will be exhausted. Then we must fall back on our bituminous coal area, which reaches the enormous total of 200,000 square miles, say over 400 times the area of the anthracite. Mr. Shearer said that the competition between our several coal companies, and by them with the bituminous coal, will always keep the price moderate. He doubted if Great Britain could much increase its own enormous product of 136,000,000 tons, yet at her present rate of increase she will exhaust her coal—above 4000 feet—in about the time in which our anthracite output will cease. But she has no 200,000 square miles, as we have in the West.

English exchanges state that Messrs. Bolckow, Vaughan & Co., of Middlesbrough, have now got the Thomas-Gilchrist process into regular practical working, and that more than one-half of their converters are supplied with pig made from local ore. Two of the converters at Esten are working with Cleveland pig, making the steel for an order of 2000 tons of rails for the Northeastern Railway Company, to whom some of the Cleveland rails have been already delivered.

The genuine Wootz steel comes from India in three forms, namely, in bullet-shaped pieces of a certain weight as they cool in the pots, and which comes from Calcutta; in cakes of 2½ pounds, from Bombay; and in cylindrical rods of about the same weight, from Golconda.

Special Notices.

THOS. TURTON & SONS, Successors to

WM. CREEAVES & SONS, Steel, File and Railway Spring Manufacturers,

SHEFFIELD, ENGLAND, desire to give notice that they have removed their place of business from

102 John Street, New York, to

40 Kilby Street, Boston, where their American interests will be in future under the management of

MR. ALEX. A. ARTHUR.

Mining & Manufacturing Property

For Sale or To Let.

A valuable property in New Jersey, at a railway station, consisting of rich iron veins, unexcavated, with a large quantity of coal and farm. Will sell all or part, or lease the factory with machinery, or the vine. For particulars apply to

THOS. H. STOUT, 79 Cedar St., New York.

AMERICAN SPECIAL MACHINERY. The attention of

FOREIGN MANUFACTURERS is invited to our facilities, for supplying the latest improvements and best workmanship.

RICHARDS & DOLE, Springfield, Mass.

For Sale.

THE MUNCIE FOUNDRY AND MACHINE WORKS, at Muncie, Indiana, consisting of the Real Estate, Machinery, Tools, Patterns, Boiler and Blacksmith Shop. These works have one among the best, if not the best, located in the country. They are at the crossroads of diverse points of six railroads, in a fine agricultural country, and has built up a large and profitable business; and is a fine opening for young men with small cash capital to build an extensive manufacturing business. Correspondence solicited, when a satisfactory reason for selling will be given, as well as a detailed statement of the property.

WYSOR, HAINES & CO., Muncie, Indiana.

WANTED.—The exclusive services of an engineer, or otherwise, of sterling integrity, energy and sobriety, who has large experience in the construction and management of coke furnaces. Undoubted references required. Address

P. O. Box 32, Philadelphia, Pa.

Special Notices.

EXECUTORS' SALE OF AN Anthracite Blast Furnace.

The subscribers, executors of the last will and testament of Peter Ulrich, late of the Borough of Easton, Pa., deceased, will sell at public sale, at the Circle, in said Borough, on

THURSDAY, October 16, 1879,

At 1 o'clock P. M.

all that certain Anthracite Blast Furnace, located in the tract of land containing about 10 acres, and lies between the Lehigh Canal and Lehigh River, just below the Chain Dam, adjoining Glendon Iron Company's furnaces. The furnace erected thereon is a sheet iron casing stack, 14½ feet high by 70 feet wide, with casing top; I. P. Morris & Co.'s low pressure condensing engine, 8 horse-power, a Kent's hot-blast oven, a casting house, engine houses, large store, two stables and a blacksmith shop. The furnace buildings are of brick and stone and put up in the best manner, with all the modern improvements. The works were built in 1871, and are in good order and nearly ready to blow in. Steel can be supplied by boats on Lehigh and Morris Canals or Lehigh Valley Railroad. The furnace can be had for \$1000, the furnace for \$450 per ton and limestone for a cent per ton. The terms and conditions will be made known on day of sale by

S. L. UHLER,
E. L. HUNT, Executors.

Sale positive to close up the estate.

Price to be paid by the highest bidder.

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Fusible Alloys and their Uses.—The name "fusible metal" or "fusible alloy" is given to a mixture of metals which becomes liquid at temperatures at or below the boiling point of water. There are several such mixtures known, some of which are as follows: 1. D'Arct's: Bismuth, 8; lead, 5; tin, 3 parts. This melts below 212° F. 2. Walker's: Bismuth, 8; tin, 4; lead, 5 parts; antimony, 1 part. The metals should be repeatedly melted and poured into drops until they can be well mixed previous to fusing them together. 3. Onion's: Lead, 5; tin, 2; bismuth, 5 parts. Melts at 197° F. 4. If to the latter, after removing it from the fire, one part of warm quicksilver be added, it will remain liquid at 170° F., and become a firm solid at 140° F. 5. Another: Bismuth, 2; lead, 5; tin, 3 parts. Melts in boiling water. Nos. 1, 2, 3 and 5 are used to make toy-spoons to surprise children by their melting in hot liquors. A little mercury (as in 4) may be added to lower their melting points. Nos. 1 and 2 are specially adapted for making electrotype molds. French electrotype molds are made with the alloys No. 2. These alloys are also used to form pencils for writing, also as metal baths in the laboratory, or for soft soldering joints. No. 4 is also used for anatomical injections. Higher temperatures for metal baths in the laboratories may be obtained by the following mixtures: 1 part tin and 2 parts lead melt at 441.5° F.; 1 part tin and 1 part lead melt at 371.7° F.; 2 parts tin and 1 part lead melt at 340° F.; 63 parts tin and 37 parts lead melt at 344.7° F.

The Future of the Anthracite Coal Fields.—Mr. P. W. Sheaffer, of Pottsville, Pa., in a paper read before the American Association, called attention to the waste in anthracite mining and marketing. The work of mining anthracite coal was begun in 1820 with 365 tons; now 20,000,000 tons per annum are produced. Mr. Sheaffer asserted that only one third of the coal goes into consumption; two-thirds are wasted, lost in the mines and in preparation. He put the maximum product at about 50,000,000 tons per annum, and at the present rate of increase this limit will be reached in the year 1900, and in 186 years, say in the year 2065, our anthracite coal fields will be exhausted. Then we must fall back on our bituminous coal area, which reaches the enormous total of 200,000 square miles, say over 400 times the area of the anthracite. Mr. Sheaffer said that the competition between our several coal companies, and by them with the bituminous coal, will always keep the price moderate. He doubted if Great Britain could much increase its own enormous product of 136,000,000 tons, yet at her present rate of increase she will exhaust her coal—above 400 feet—in about the time in which our anthracite output will cease. But she has no 200,000 square miles, as we have in the West.

English exchanges state that Messrs. Bolckow, Vaughan & Co., of Middlesbrough, have now got the Thomas-Gilchrist process into regular practical working, and that more than one-half of their converters are supplied with pig made from local ore. Two of the converters at Euston are working with Cleveland pig, making the steel for an order of 2000 tons of rails for the Northeastern Railway Company, to whom some of the Cleveland rails have been already delivered.

The genuine Wootz steel comes from India in three forms, namely, in bullet-shaped pieces of a certain weight as they cool in the pots, and which comes from Calcutta; in cakes of 2½ pounds, from Bombay; and in cylindrical rods of about the same weight, from Golconda.

Special Notices.

THOS. TURTON & SONS,
Successors to
WM. CREEVES & SONS,
Steel, File and Railway Spring
Manufacturers,
SHEFFIELD, ENGLAND,

desire to give notice that they have removed their place of business from

10½ John Street, New York,

to

40 Kilby Street, Boston,
where their American interests will be in future under the management of

MR. ALEX. A. ARTHUR.

**Mining & Manufacturing
Property**

For Sale or To Let.

A valuable property in New Jersey, at a railway station, consisting of rich Iron Ores, unexcavated Water Power, large Factories, Farm, Will sell all or part, or lease the Factory with Machinery, or the Mine. For particulars apply to THOS. H. STOUT, 79 Cedar St., New York.

**AMERICAN
SPECIAL MACHINERY.**

The attention of
FOREIGN MANUFACTURERS
is invited to our facilities, for supplying the latest improvements and best workmanship.

RICHARDS & DOLE,
Springfield, Mass.

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Correspondence solicited, and a good business. Correspondence solicited, when a satisfactory reason for selling will be given, as well as a detailed statement of the property.

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E. I. HUNT,

Same positive to close up the estate. Executors.

Rolling Mill for Sale.

The Real Estate, Machinery, Fixtures and Tools of the PORTLAND ROLLING MILLS will be sold at public auction, without reserve, to the highest bidder, at the mills.

TUESDAY, September 30, 1879,

At 3 o'clock P. M.

The property of the company consists of 60 acres of land on tidewater, in the town of Cape Elizabeth, Maine. Contains 10 buildings, including mine shafts' drive of the city of Portland. Besides the main building the company owns 15 tenements in 26 buildings, one half used for church purposes, two stores and a thoroughly well fitted office, with fire-proof vault and all modern improvements. All the buildings are in good repair.

The mill contains one blast furnace, and one blast furnace with all the machinery appertaining to the manufacture of rails and bar iron. Its capacity is 14,000 tons of iron rails or 600 tons of merchant iron per year.

The property is provided with a thoroughly built dock, at which vessels of 300 tons capacity can lie at low water, and is directly connected by rail with all the railroads centering at Portland.

The mill is not in operation, but possession will be given on the 15th of October, 1879.

PHILIP HENRY BROWN, President,
Portland, Maine.

PARK BENJAMIN'S SCIENTIFIC EXPERT OFFICE,

37 Park Row, New York.

Examines and reports on the novelty of inventions. Furnishes recipes and information on all industrial processes.

Prepares drawings and engravings of machinery. Tests, designs, constructs and selects machinery. Address,

G. H. BENJAMIN,
Business Manager.

Special Notice.

Hardware Manufacturers' Exchange,

43 Chambers Street, New York.

The undersigned desires to inform all Manufacturers of Hardware throughout the United States that he has fitted up rooms, centrally located, well lighted, &c., for the exhibition of manufactured goods in all lines of hardware. Any manufacturer can at a small annual cost exhibit his wares to actual buyers throughout the year, and all visitors can examine them free.

The advantages to both manufacturers and buyers are too apparent to need any explanation.

For further particulars and application for space address

W. G. FULTON, Manager.

HARDWARE STORE FOR SALE,

In Dover, N. H., to Close an Estate.

The old established Hardware Store of G. F. ROLLINS & CO., with a well-selected stock of \$8000 to \$9000, and a good run of custom.

W. M. H. ROLLINS,
Administrator.

Dover, N. H., Sept. 4, 1879.

For Sale,

One Iron Planer to plane five feet square and ten feet long. Cross and angle feed. Cross head moved up and down by power. Machine in excellent condition. Address,

GEO. PLACE, Agt.,
1st Chambers St., New York.

SITUATION WANTED.—In wholesale or first-class well-known houses, thoroughly competent hard-working man, long commercial experience, to find a position. Is posted in builders' and general hardware; is a competent bookkeeper and good salesman. No objection to leave the city. Address for reference and full particulars.

WILLIAMS, P. O. Box 128, New York City.

A THOROUGH SALESMAN, with many years' experience on the road, and a good acquaintance with the Hardware Trade both East and West, is open for an engagement. Could invest, if desired, a few thousand dollars in a sure and good thing where the man is needed more than the money. Speaks German. Please address F. FRITZ, Office of The Iron Age, 83 Reade St., New York.

**AMERICAN
SPECIAL MACHINERY.**

The attention of

FOREIGN MANUFACTURERS
is invited to our facilities, for supplying the latest improvements and best workmanship.

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Same positive to close up the estate. Executors.

Special Notices.

Second-Hand & New Tools FOR SALE.

September List.

The Tools in the following list are all of Wood, Light & Co.'s make, have been used, but are all in good order and will be sold very low:

Five Engine Lathes, 15 in. swing 6 ft. bed.

Six Engine Lathes, 20 in. swing 7½ ft. bed.

Five Engine Lathes, 20 in. swing 8 ft. bed.

One Engine Lathe, 21 in. swing 6 ft. bed.

One Engine Lathe, 21 in. swing 16 ft. bed.

One Engine Lathe, 21 in. swing 18 ft. bed.

Two Upright Drills, 27 in. swing, not geared.

One Upright Drill, 24 in. with bk. gear and self feed.

One No. 0, 2 spindles.

One No. 2, " 2 spindles geared for heavy work.

One No. 1 Power Milling Machine.

One No. 2 Spindle Grinder.

One Double Cam Cutting Machine.

WOOD, LIGHT & CO.'S TOOLS.</p

Spelter and Zinc.—The market since our last report has been featureless, on the basis of 6¢ asked for Western. We quote: Common Domestic, 5½¢ @ 6¢; Silesian, 6½¢ @ 6½¢; Refined Domestic, 8¢ @ 8½¢; and Bergeneport from Lehigh ore, 9¢. Sheet Zinc is firm at 7½¢ @ 7¾¢. London, Sept. 16.—Quotations are fairly well maintained, but there is rather less inquiry. Producers are said to be almost void of stock, and, owing to the increased demand for galvanized iron, sellers are expecting this metal to increase in value later on.

Nickel.—Is unaltered at \$1.25 for prime American.

Antimony.—There has been considerable activity in this metal at last week's prices, since when the latter have been raised to 13¢ @ 13½¢.

EXPORTS

Danish West Indies. Quan. Value.

Ptgm., gals... 3155 \$607 Hdw., cs... 200 359 Pump... 1 40

Bremen.

Mf. iron, pkgs 4 423 Lea. belt., cs... 1 200 Ag. imp., pkgs 6 348 Hdw., cs... 3 123 Lub. oil, bbls 889

Stockholm.

Ptgm., gals... 92,687 6,815

Elsinore.

Ptgm., gals... 19,790 12,968

Hamburg.

Hdw., cs... 57 1,734 Ag. imp., pkgs 3 340 Belting, bales 3 340 Gas fixt., cs... 4 7 Pumps, pkgs 17 950 Mach'y, pkgs 87 7,006 Tinware, cs... 5 860 W. c. carts, cs 8 Tinsware, cs... 8 500 Sew. mach., cs 18 445 Iron rolls, cs... 2 240

Antwerp.

Ptgm., gals... 6,627 6,015 Ag. imp., pkgs 33 1,978

Cristiania.

Ptgm., gals... 68,700 7,895

Danske.

Ptgm., gals... 164,573 11,793

Gothenburg.

Ptgm., gals... 23,343 1,486

Konigsberg.

Ptgm., gals... 246,390 10,046

Stettin.

Ptgm., gals... 444,125 36,989

Amsterdam.

Ptgm., gals... 244,400 17,708

Rotterdam.

Mach'y, cs... 3 300 Copper, bales 45 8,430 Pldw., cs... 3 33 Belting, pkgs 5 445 Lub. oil, gals 19,835 Hdw., cs... 35 833 Pump, pkgs 87 1,300

London.

Slates, pces. 106,713 3,000 Lab. oil, gals... 41,456 8,905 Mach'y, cs... 30 2,063 Hdw., cs... 134 5,101 Glassw'e., cs... 11 63 Pump, pkgs 87 1,300

Hayti.

Ptgm., gals... 5600 506 Nails, kegs... 41 229 Plates, cs... 0 442 Hdw., cs... 10 304 Mf. iron, pkgs 31 44

Brazil.

Mach'y, cs... 5 133 Ptgm., gals... 10,288 971 Nails, kegs... 105 273 Cutlery, cs... 13 2,324 Plates, cs... 10 60 Pump, pkgs 5 237 Hdw., cs... 10 60 Belting, bales 2 149 Cartridges, cs. 1 96 Rifles, cs... 3 1,028 Spelter, slabs, 1,660 5,040 Mf. iron, pkgs 14 287 Ptgm., gals... 7,75,582 62,630 Sew. mach., cs... 19,205 Bars, da... 19 913 Nails, kegs... 3 200 Plates, cs... 0 50 Slates, cs... 40 100 Nails, kegs... 35 845 Pump, pkgs 4 93 Gun cargo, cs 1 1,200 Gums, cs... 6 286 Ox. zinc, bbls 101 717 Ag. imp., pkgs 2 1,205 Lub. oil, bbls 56 560

China.

Lhdw., cs... 230 7,688 Cutlery, cs... 9 530 Metal g'da., cs 21 2,495 Pldw., cs... 11 1,100 Lead, rebs, bags 10 840 Sew. mach., cs 51 984 Rifles, cs... 0 725 Tinware, cs... 15 381 Ag. imp., pkgs 1 200 Nails, kegs... 1 50 Mach'y, cs... 8 420 Ptgm., gals... 351,111 27,081 Mf. iron, pkgs 11 250 Gun cargo, cs 1 1,200 Gums, cs... 8 202 Pistols, cs... 3 700

Glasgow.

Rifles, case... 1 300 Hdw., pkgs... 24 1,633 Mach'y, cs... 11 1,933 Ag. imp., pkgs 8 432 Belting, cs... 1 492 Glassw'e., cs... 6 25

Queentown.

Ptgm., gals... 173,581 14,043

Canada.

Glassw'e., pgs. 14 79

British Guiana.

Hdw., cs... 5 75 Ptgm., gals... 20,000 1,700

British North American Colonies.

Coal, tons... 608 1,748 Ptgm., gals... 35,568 3,808

British Possessions in Africa.

Pldw., cs... 1 180 Mach'y, pkgs 968 11,845 Hdw., cs... 4 4,005 Ptgm., gals... 11,901 1,725

British Australia.

Ptgm., gals... 426,800 43,686

Bordeaux.

Sew. mach., cs 16,160 Ptgm., gals... 209,866 12,329 Glassw'e., cs... 1 15

French West Indies

Ptgm., gals... 2,000 200

Canary Islands.

Copper, cake... 82 14,625 Sew. mach., cs 3 80 Hdw., cs... 5 300 Glassw'e., cs... 23 128

Havre.

Copper, cake... 82 14,625 Ag. imp., pkgs 22 1,055 Silverware, cs 1 300 Ptgm., gals... 310,179 15,120

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending Sept. 16, 1879:

Hardware.

Alexandre F. & Sons, Cartridges, bx., 1 American Fencing Co., Iron wire, bds., 28 Bloomfield J. C. & Co., Machinery, pkgs, 28 Mdse., pkgs, 23 Baker, Hermann & Co., Hdws., cs... 51 160 Hdws., pkgs, 16 Brockner & Evans, Galvanizing wire netting, rolls, 20 Carey Samuel, Grinding stones, cks., 13 Cary & Moen, Cast steel wire, bds., 2 Chapman J. L., Machinery, cs, 5 Degraw, Aymer & Co., Chain, cks., 8 Chain, lengths, 5 Donisthorpe, James, Machinery, pkge, 2 Eriksen and North Shore Line, Hdws., pkgs, 14 Fletcher, Harrison & Co., Sheet iron, bds., 18 Folsom H. D., Guns, cs, 3 Mdse., pkgs, 5 Hermann H. & Co., Mdse., pkgs, 93 Lalance & Grosjean, Mdse., pkgs, 1 Mdse., pkgs, 12 Livingstone, F., Grindstones, cks., 20 Mainz Beer Sugar Co., Hdws., pkgs, 167 Hdws., cs... 10 150 Glassw'e., pgs 745 Nails, kegs... 107 125 Wire, bds., 26 Gun wheels, pr 20 Tinware, cs... 3 72 Sew. mach., cs 6 124 S. w. app'res. 2 131

China.

Ptgm., gals... 243,008 18,500

Merchandise.

Mach'y, pkgs 563 20,935 Hdws., cs... 25 805 Ag. imp., pkgs 24 1,310 Hdws., pkgs, 16 3,014 Hdws., pkgs, 24 1,310 Ptgm., gals... 14,597 1,920 Hdws., cs... 25 805 Nails, kegs... 31 93 Glassw'e., cs... 35 348 Hdws., cs... 7 125 Ag. imp., pkgs 12 1,215 Copper cans... 64 394

British East Indies.

Ptgm., gals... 422,200 43,720

Stockholm.

Ptgm., gals... 92,687 6,815

Elsinore.

Ptgm., gals... 19,790 12,968

Hamburg.

Hdw., cs... 57 1,734 Ag. imp., pkgs 3 340 Belting, bales 3 340 Gas fixt., cs... 4 7 Pumps, pkgs 17 950 Mach'y, pkgs 87 7,006 Tinware, cs... 5 860 W. c. carts, cs 8 Tinsware, cs... 8 500 Sew. mach., cs 18 445 Iron rolls, cs... 2 240

Antwerp.

Ptgm., gals... 6,627 6,015 Ag. imp., pkgs 33 1,978

Naples.

Ptgm., gals... 243,008 18,500

Venezuela.

Mach'y, pkgs 563 20,935 Hdws., cs... 25 805 Ag. imp., pkgs 24 1,310 Hdws., pkgs, 16 3,014 Ptgm., gals... 14,597 1,920 Hdws., cs... 25 805 Nails, kegs... 31 93 Glassw'e., cs... 35 348 Hdws., cs... 7 125 Ag. imp., pkgs 12 1,215 Copper cans... 64 394

Christiania.

Ptgm., gals... 68,700 7,895

Danske.

Ptgm., gals... 164,573 11,793

Gothenburg.

Ptgm., gals... 23,343 1,486

Konigsberg.

Ptgm., gals... 246,390 10,046

Stettin.

Ptgm., gals... 444,125 36,989

Amsterdam.

Ptgm., gals... 244,400 17,708

Rotterdam.

Mach'y, cs... 3 300 Copper, bales 45 8,430 Pldw., cs... 3 33 Belting, pkgs 5 445 Lub. oil, gals 19,835 Hdw., cs... 35 833 Pump, pkgs 87 1,300

London.

Slates, pces. 106,713 3,000 Lab. oil, gals... 41,456 8,905 Mach'y, cs... 30 2,063 Hdw., cs... 134 5,101 Glassw'e., cs... 11 63 Pump, pkgs 87 1,300

Hayti.

Ptgm., gals... 5600 506 Nails, kegs... 41 229 Plates, cs... 0 442 Hdw., cs... 10 304 Mf. iron, pkgs 31 44

Brazil.

Mach'y, cs... 5 133 Ptgm., gals... 10,288 971 Nails, kegs... 105 273 Cutlery, cs... 13 2,324 Plates, cs... 10 60 Pump, pkgs 5 237 Hdw., cs... 10 60 Belting, bales 2 149 Cartridges, cs. 1 96 Rifles, cs... 3 1,028 Spelter, slabs, 1,660 5,040 Mf. iron, pkgs 14 287 Ptgm., gals... 7,75,582 62,630 Sew. mach., cs... 19,205 Bars, da... 19 913 Nails, kegs... 3 200 Plates, cs... 0 50 Slates, cs... 40 100 Nails, kegs... 35 845 Pump, pkgs 5 93 Gun cargo, cs 1 1,200 Gums, cs... 6 286 Ox. zinc, bbls 101 717 Ag. imp., pkgs 2 1,205 Lub. oil, bbls 56 560

China.

Lhdw., cs... 230 7,688 Cutlery, cs... 9 530 Metal g'da., cs 21 2,495 Pldw., cs... 11 1,100 Lead, rebs, bags 10 840 Sew. mach., cs 51 984 Rifles, cs... 0 725 Tinware, cs... 15 381 Ag. imp., pkgs 1 200 Nails, kegs... 1 50 Mach'y, cs... 8 420 Ptgm., gals... 351,111 27,081 Mf. iron, pkgs 11 250 Gun cargo, cs 1 1,200 Gums, cs... 8 202 Pistols, cs... 3 700

Glasgow.

Rifles, case... 1 300 Hdw., pkgs... 24 1,633 Mach'y, cs... 11 1,933 Ag. imp., pkgs



The demand for Scroll Saws has become so large that most Hardware dealers are getting in the way of keeping them.

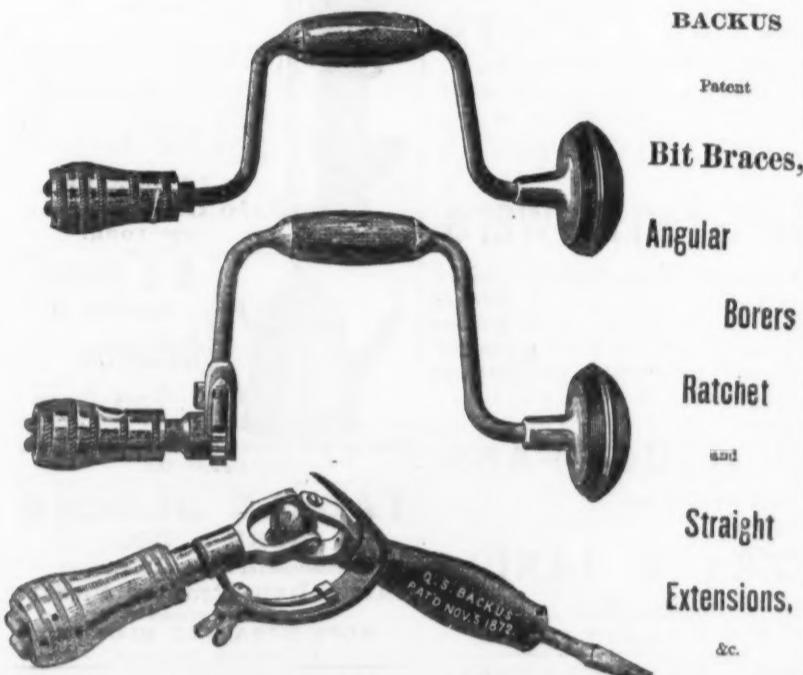
The trade commences in early fall and lasts all winter, thus helping business in the dullest season. There is probably not a Hardware store in the land but that could sell some of these goods.

We are headquarters for hand and foot-power Saws, Saw Blades, Wood, Designs and all things pertaining to this business. The Lester Saw at \$8 and Rogers Saw at \$3 are now in universal demand. The Lester Saw consists of a Scroll Saw, Circular Saw, Drilling Attachment, Emery Wheel, Dust Blower, Turning Lathe and Tools, extra Saw Blades, Drill Points, Designs, Screw Driver, Wrench, &c. It has been greatly improved since last year, and is a very perfect machine. The Rogers Saw consists of a Scroll Saw, Drilling Attachment, Dust Blower, Designs, Drill Points, Saw Blades, Wrench, &c. The Saws are nicely boxed, without extra charge. We warrant them in all respects. They give dealers no trouble.

MILLERS FALLS CO., 74 Chambers Street, NEW YORK.

Q. S. BACKUS,

Sole Manufacturer of the



Comprising every grade of quality and finish, from the cheapest Farmers' Brace to the finest Steel Sweep heavily nickel plated, with rose-wood handles and lignum vita heads, being the most complete line offered by any manufacturer in the country, and which for simplicity of construction and effectiveness have no equal. Catalogues and price lists furnished upon application at office and salesroom.

No. 102 Chambers Street, NEW YORK.



Adjustable Stock and Dies For Pipe and Bolts,

Have the following advantages:

1st.—The Armstrong Improved Dies can be adjusted to the variations in the size of fittings.

2d.—The Armstrong Dies, by reason of their peculiar cutting edge, can be worked with much less labor, and accomplish the desired results in less time, than with the solid Die.

3d.—The Armstrong Dies have a double taper, that is, the taper at the entrance for the first few threads is greater in degree than the standard taper, which forms a lead to the Dies, causing them to start on the pipe without filing, even when there is a swell or burr, and requiring no pressure whatever to start the Dies on the pipe.

4th.—The Armstrong Dies being made in two parts instead of one (as in the solid Die), can be more perfectly constructed; the cutting edges reached more directly; the work done with greater precision and uniformity, by which they accomplish a much better result.

5th.—The Armstrong Dies can be sharpened without drawing the temper, and can be kept in good condition easier and with less expense than any other Dies ever offered to the public. A mechanic can sharpen these Dies, and is not obliged to send them to the manufacturer, as is the case with solid Dies when they become dull.

6th.—The Armstrong Dies are interchangeable in the stock, and although adjustable, do not need adjusting to cut the standard size for which the dies are made. The adjusting is only done when the irregularity or variations in the fittings make it necessary. There are corresponding marks (s) on the Stock and on the Dies (s) and when these marks are brought into line the Dies will cut the standard size.

For sale by leading dealers in Hardware and Steam and Gas Fitters' Tools. For further particulars address,

F. ARMSTRONG, Bridgeport, Conn.

THORNE, DeHAVEN & CO., Drilling Machines, 21st Street, above Market, Philadelphia.

PORTRAL DRILLS. Driven by power in any direction.
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.
VERTICAL DRILLS. Self-feeding.
MULTIPLE DRILLS. 2 to 20 Spindles.
HORIZONTAL BOILING AND DRILLING MACHINES.
HAND DRILLS. CAR BOX DRILLS.
SPECIAL DRILLS. For Special Work.

NATIONAL Horse Nail Co. MANUFACTURERS OF FINISHED (BRIGHT OR BLUED)



These nails are made of the best brands of NOR-WAY IRON, and are guaranteed to be equal to any in the market.

NATIONAL HORSE NAIL CO., VERGENNES, VT.

HORACE DURRIE & CO., Agents,
No. 97 Chambers St., New York

A. F. PIKE. East Haverhill, New Hampshire, Manufacturer and Wholesale Dealer in Seythe, Axe, Knife and Hacker STONES.

Factories at Haverhill and East Haverhill, N. H., and Evansville and Westmore, Vt.

Genuine OLD RELIABLE,
INDIAN FOND (red Ends),
LETOILE,
LA MOILLE,
DIAMOND GRIT,
IRON,
WHITE MOUNTAIN,
PREMIUM,
EVERY MOUNTAIN,
MOVING MACHINE,
RAGG.

Stones gotten up and labeled in
any style desired.
IRON & QUARTZ GUARANTEED.
All the above Stones are of good
k. on grit and will not glaze.

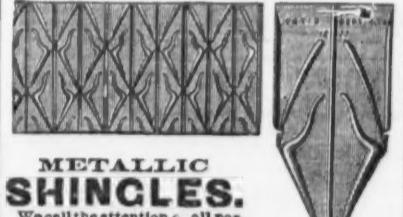
The Oldest Shot Tower in America. FOUNDED JULY 4, 1808.



THOMAS W. SPARKS, Manufacturer of SPARKS'

American Chilled Shot, Rivaling the English and all Others.

STANDARD DROP & BUCK SHOT
AND BAR LEAD.
191 Walnut Street, Philadelphia.



METALLIC SHINCLES.

We call the attention of all parties interested in Roofing, and the overhanging eaves, to the above article. It is asserted to be the best, cheaper, fire proof, about one-fourth the weight, much closer, therefore is storm proof, cannot crack, &c. Any carpenter can put them on. Send for description and prices to Iron and Manufacturing Co., 23rd Street, Brooklyn, N. Y.

Grant Fan Mill & Cradle Co.

Manufacturers of

Grant's Grain, Coffee, Rice, Cochineal
and Pimento Fans,

and

TURKEY WING GRAIN CRADLES,

4, 5 and 6 fingers.

GRAPE VINE GRAIN CRADLES,

4 fingers.

SOUTHERN PATTERN GRAIN

CRADLES,

All 4, 5 and 6 fingers.

None genuine unless marked

Grant Fan Mill and Cradle Co.

Send for illustrated catalogue

and prices.

P. O. Address,

MELROSE, Rensselaer Co., N. Y.

RIEHL BROS. STANDARD

SCALES AND TESTING MACHINES

Patent "Self-Adjusting" Railroad Track Scales, pronounced "the most accurate and durable" over all competitors at World's Fair, 1876. In use by Pennsylvania, Lehigh Valley, Baltimore and Ohio, and other Railroads, Coal and Oil Scales. Warehouse and Platform Scales and Scales for all purposes. Machines for testing materials, all sizes.

Works 9th st., at Master; Stores 52 & 54th st., Phila.

New York Office, 91 Liberty Street.

Boilers, Engines and Tanks for Sale

21st Street, Jersey City. Repairs promptly attended.

Established in 1839.

Formerly L. & A. G. COES.

L. COES & CO.

Manufacturers of L. Coes'

GENUINE IMPROVED
AND MECHANICS



Patent Screw Wrenches

UNDER PATENTS DATED

JUNE 26, 1866,
MARCH 23, 1869,
REISSUED 1870.

NOVEMBER 10, 1863,
FEBRUARY 23, 1864,
REISSUED JUNE 1, 1869,
IMPROVED AUG. 1, 1877.

The back thrust when in use borne by the SHANK instead of the Handle.
None genuine unless stamped "L. COES & CO."

WORCESTER, MASS.

Warehouse, 97 Chambers St. & 31 Reade St., N.
HORACE DURRIE & CO., Sole Agents.

METAL STAMPING AND ENAMELING CO.,

SOLE MANUFACTURERS OF

Light,



Insoluble,

Durable,

Brilliant,

Impervious,

Trustworthy.

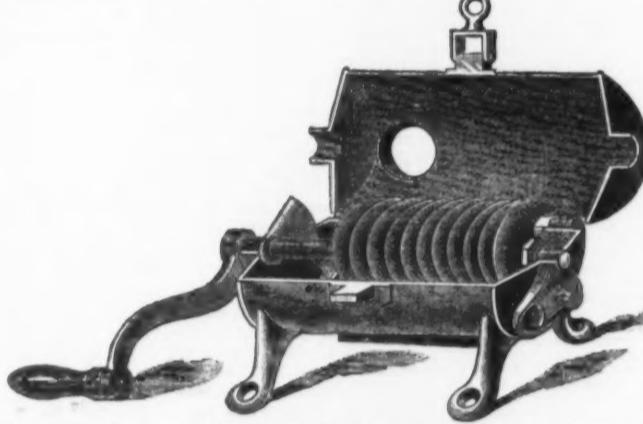
THE LAST DISCOVERY IN ENAMELS.

Every desired quality secured in connection with a brilliant white finish, a thing never achieved before. Handsome as stone china. Admired universally, and to-day without a rival.

For samples and catalogue address the manufacturers.

708, 710, 712 N. 2d Street, St. Louis, Mo.

THE PENNSYLVANIA MEAT CUTTER



Has the capacity of Cutters upon the market which cost 60 per cent. more money.

PRICE LIST.

No. 1, containing 5 Steel Knives.....	per dozen, \$4.00
No. 2, " "	" 3.00
No. 3, " "	" 3.00
No. 1 and 2 are packed 1/2 dozen in a box; No. 3 packed 1/4 dozen in box.	Discount to the trade 10 and 10 per cent.

Orders solicited.

LLOYD, SUPPLEE & WALTON, Philadelphia.

HORACE DURRIE & CO., New York City.

BRASS AND REAL BRONZE CASTINGS

Also, White Metal Castings for Patterns.

PAYSON & CO.,

1319 to 1325 W. Jackson St., and
166 Randolph St.,

CHICAGO.

LANE'S MEASURING FAUCET.

Price, \$3.00.

For Light or Heavy Molasses, Oils, Varnishes or other Fluids.

We warrant these Faucets to be as represented, measuring correctly and working more easily in heavy molasses than any Measuring Faucet in the market. No grocer can afford to be without them. They save time and "time is money." They insure perfect cleanliness, requiring no tin measures or funnel to collect dirt and draw fluid. They do not get stuck, nor will they move when the crank is turned. They are the embodiment of simplicity, and consequently they are always in order. They work easily in the hands, and are safe. They are warranted to measure correctly, according to U. S. Standard.

MANUFACTURED EXCLUSIVELY BY

LANE BROTHERS, Millbrook, N. Y.

General Agency, GRAHAM & HAINES, 113 Chambers St., New York.

WATERBURY MFG. CO.,

WATERBURY, CONN.,

MANUFACTURERS OF

BRASS MACHINE SCREWS

Of every description, at lowest cash prices. Also,

All Styles Nuts, Washers, Ferrules and Brass Goods Generally.

PLUMBERS' AND GAS FITTERS' SUPPLIES A SPECIALTY.

The privilege of estimating on special articles solicited.

ized sheets are similarly stiffer. A Liverpool house is said to have an American order for 7000 tons of cotton ties, to give out in lots of 1000 tons each, and Earl Dudley's horse-shoe iron is stated to be selling freely for your consumption. At Wolverhampton orders for locks are reported from your side, and the same thing has happened at Willenhall. From Stockton-on-Tees 2000 tons of Messrs. Bell's Clarence pig is said to have been ordered by New York buyers. In South Wales and Monmouthshire there is an anticipation that Cyfarthfa may shortly again be started. An able manager from Dowlais is alleged to have been secured, and rumor points to a matrimonial alliance between a Quest and a Crawshay as a probable means of resuscitating the famous old place.

FOREIGN.

FRANCE.

(Moniteur des Intérêts Matériels.)

PARIS, Aug. 31, 1870.—Metals.—The week has been duller than its predecessor, a great many merchants having returned to the country.

Copper.—This metal has been rather quiet, with a decline of between 1 and 2½ francs the 100 kilos.

Nickel.—The price of Nickel is 12½ francs per kilo.

Iron.—There is no market for Iron.

Steel.—There is a stock of 12,000 piculs Billiton.

Copper.—The price of Copper is 12½ francs per kilo.

Lead.—There is a stock of 12,000 piculs Billiton.

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The Iron Age Directory

and Index to Advertisements.

PAGE.

Agricultural Implements.	
Johnson, Gero & Truman, Owego, N. Y.	
Miner & Co., A. W., Belmont, N. Y.	
Wheeler & Melick Co., Albany, N. Y.	8
Air Compressors.	
Coleman Pump Works, 14 and 16 Water st., Brooklyn, N. Y.	36
Alarm Money Drawers.	
Hales Alum. Till Mfg. Co., Providence, R. I.	11
Frost & Dyer, Indianapolis, Ind.	10
Anti-Friction Metals.	
Keever Paul S., Philadelphia.	26
Apvils, Manufacturers of.	
Hilliard & Son, New York, N. J.	24
Architectural Iron Works.	
Ezra Iron Co., So. Gorok, N. Y.	4
Augers, Bits, etc., Manufacturers of.	
Georgi Bros., New York, N. Y.	26
Snell Mfg. Co., Beckman, N. Y.	8
Axes, Springs, &c., Manufacturers of.	
Cook R. & Sons, Winsted, Conn.	12
Hoffman, E. & Son, 62 Front st., N. Y.	12
Lambertville Iron Works, Lambertville, N. J.	12
Sheldon & Co., Auburn, N. Y.	12
Babbitt Metal.	
Phenix Babbitt Smelting Co., 12th and Noble, Phila.	29
Bag Holders.	
Sprangle L. J., Ashland, Ohio.	22
Barb Wire.	
Tinsel Barb Hedo Co., 34 Canal, Chicago, Ill.	22
Bellow, Manufacturers of.	
Scott Geo. M., Chicago, Ill.	22
Bells (Sleighs).	
Bevin Bros. Mfg. Co., Easthampton, Conn.	24
Belting, Makers of.	
Albion Belting Co., N. J.	35
Forepaugh Wm. F. Jr. & Bros., Philadelphia.	31
N. Y. Belting and Packing Co., 3 Park Row, N. Y.	0
Bird Cages, Makers of.	
Jewett John C. & Sons, Buffalo, N. Y.	12
Lightning Rod Co., Peoria, Ill.	10
Maxheimer John, 247 and 248 Pearl, N. Y.	7
Bit Braces, Manufacturers of.	
Bacchus Q. S., 10 Chambers, N. Y.	22
Fray & Pigg, Bridgeport, Ct.	22
Millers Radi Co., 74 Chambers, N. Y.	22
Blind Awning Fixtures.	
Rogers Bros., Boston, Mass.	22
Block & Tackle, Makers of.	
Burr & Co., at Peck Slip, N. Y.	22
Groupers, Makers of.	
Kingsbury F. L., Duane 13th st., Wall, N. Y.	22
Peck Block & Wood, Liverpool, N. Y.	7
Providence Tool Co., Providence, R. I.	22
Bolt Cutters.	
National Bolt and Pipe Mach. Co., Cleveland, O.	34
Stockwell Screw & Machine Co., Cleveland, O.	34
Wright Bros., Greenfield, Mass.	34
Bolt Forging Machines.	
Forsyth S. C. & Co., Manchester, N. H.	22
Bolts (Screw).	
Coleman Eagle Bolt Works, Philadelphia.	22
Bow and Shoe Heel Strengtheners.	
Lyon N. & Son, Newark, N. J.	13
Bowls, Makers of.	
Talbot W. & J., 200 Pearl, N. Y.	22
Braas, Manufacturers of.	
Ansonia Brass and Copper Co., 25 Clift, N. Y.	22
Briquettes, Co., Bridgeport, Conn.	22
Braas Goods Mfg. Co., 4 Chambers, N. Y.	22
Broadway Fixtures.	
Wood H. S. & Co., 23 West, N. Y.	22
Wood Walter R., 23d and 25th Front, N. Y.	22
Worthington & Sons, North Amherst, Ohio.	22
Buckles, Makers of.	
McMillan, Wm. & Bros., 11th South, N. Y.	7
Peck Block & Wood, Liverpool, N. Y.	7
Providence Tool Co., Providence, R. I.	22
Bolt Cutters.	
National Bolt and Pipe Mach. Co., Cleveland, O.	34
Stockwell Screw & Machine Co., Cleveland, O.	34
Wright Bros., Greenfield, Mass.	34
Bolt Forging Machines.	
Forsyth S. C. & Co., Manchester, N. H.	22
Bolts (Screw).	
Coleman Eagle Bolt Works, Philadelphia.	22
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Bowls, Makers of.	
Talbot W. & J., 200 Pearl, N. Y.	22
Braas, Manufacturers of.	
Ansonia Brass and Copper Co., 25 Clift, N. Y.	22
Briquettes, Co., Bridgeport, Conn.	22
Braas Goods Mfg. Co., 4 Chambers, N. Y.	22
Broadway Fixtures.	
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Wood Walter R., 23d and 25th Front, N. Y.	22
Worthington & Sons, North Amherst, Ohio.	22
Buckles, Makers of.	
McMillan, Wm. & Bros., 11th South, N. Y.	7
Peck Block & Wood, Liverpool, N. Y.	7
Providence Tool Co., Providence, R. I.	22
Bolt Cutters.	
National Bolt and Pipe Mach. Co., Cleveland, O.	34
Stockwell Screw & Machine Co., Cleveland, O.	34
Wright Bros., Greenfield, Mass.	34
Bolt Forging Machines.	
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Bolts (Screw).	
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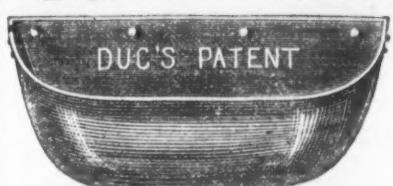
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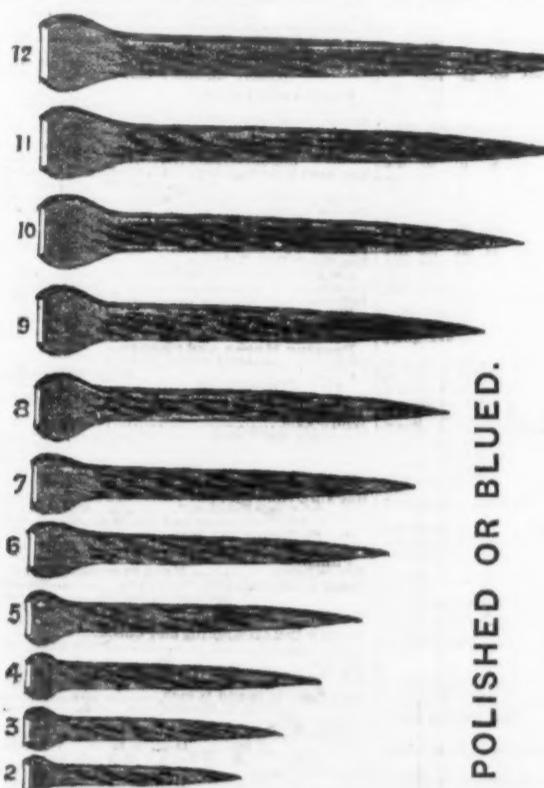
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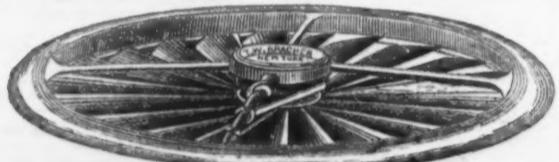
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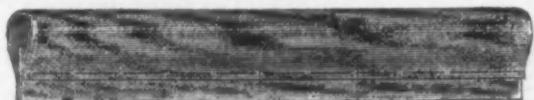
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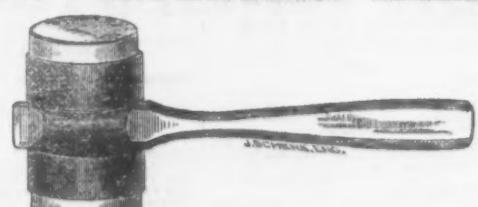
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GEO. SANDERSON & CO.,
MANUFACTURERS AND

Importers of STEEL,

Removed to 30 Gold Street, New York.

Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS,
TABLE and POCKET CUTLERY, TOOLS, TAPS and DIES; also for COLD ROLLED STEEL for
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A Large Assorted Stock of JOHN ROTHERY'S FILES always on hand.

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NEWARK STEEL WORKS.

BENJAMIN ATHA & CO.,

Manufacturers of

BEST REFINED CAST STEEL

And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

Warranted most superior for TOOLS AND GRANITE ROCK DRILLS.

A full assortment of this universally approved OLD BRAND and other Steels for sale by

EDWARD FRITH & SON, Agents,

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LABELLE STEEL WORKS.

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Manufacturers of ALL KINDS OF

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OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.

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Represented at Boston by WETHERELL Bros., 21 Oliver St.; at Milwaukee by JOHN PRITZLAFF, 45 to 49 West Water St.; at Chicago by A. D. KIRKMAN, 86 to 88 Michigan Ave.

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In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives,
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FOREST CITY STEEL CO.,

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Crucible Steel for Drills, Taps, Dies, Tools, Mill Picks, &c.

Testimonial of D. J. Jones, Roll Turner, Cleveland Rolling Mill Co.

"I have been testing the steel on chilled iron rolls along with the best English and American steels,
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Samples furnished for trial. Quality guaranteed equal to any.

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Special Steel

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LATHES, PLANERS, &c.

Turns out at least double work by increased speed
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Used for refining and tempering
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Increases their durability at
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Secures absolute safety from
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GRINDSTONES.

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The largest manufacturers in the world of
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GRINDSTONES,
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ROYAL MILLS LONDON EMERY. Prices Low.

Please write for information and prices.

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Rifle, Sporting and Blasting Powder

The most popular Powder in use.

DUPONT'S Gunpowder Mills, established

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DUPONT'S DIAMOND GRAIN,

Nos. 1 (coarse) to 4 (fine), unequalled in strength, quick-
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Nos. 1 (coarse) to 5 (fine), burning slowly, strong and
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DUPONT'S EAGLE RIFLE,

A quick, strong, clean Powder of very fine grain for
Pistol shooting.

DUPONT'S RIFLE, Fr., "

Steel.
THE EDGAR THOMSON STEEL CO.,
LIMITED.
 MANUFACTURERS OF



General Office and Works at Bessemer Station (Penn. R. R.), Allegheny County, Pa.
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The members of the Edgar Thomson Steel Company, Limited, have had large experience in manufacturing steel for railways, and their works are the best complete in the world, with all the late improvements, and are located in the best Bessemer Steel district in the United States, and their managing officers are experienced in the manufacture of Bessemer Steel.

The Company warrants its rails equal in quality to any manufactured in the United States. Rails of any weight or section furnished on short notice. Orders for trial lots solicited.

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 THE TRADE MARK, IN ADDITION TO THE NAME, IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY JOHN WILSON.



GRANTED A.D. 1766, BY THE CORPORATION OF CUTLERS OF SHEFFIELD, AND PROTECTED BY ACT OF PARLIAMENT. WORKS—SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750

North Chicago Rolling Mill Co.
 ESTABLISHED 1847. CAPITAL, \$3,000,000. INCORPORATED 1869.
 Works at Chicago, Ill., and Milwaukee, Wis.
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OFFICES:
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PICKS, MATTOCKS, CRUB HOES, HAMMERS.

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Sole Agents for
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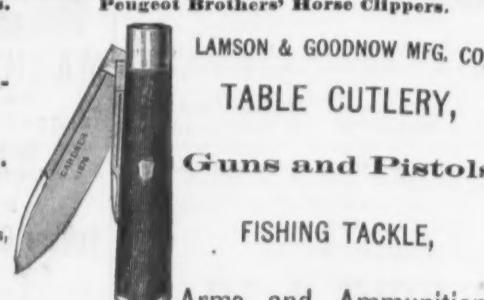
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 Unequalled and "Warranted Superior to All."

Pocket Knives and Barrows.

Also a full stock of

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POCKET CUTLERY & RAZORS.



Philadelphia Smelting Co.,
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GENUINE BABBITT,
 Guaranteed at a speed of 10,000 a minute, and at any pressure for 10 years.
ALL GRADES OF ANTI-FRICTION METALS.
DEOXIDIZED BRONZE,

Superior to Phosphor Bronze or any other alloy of Copper and Tin for Machinery Journals, Solders, Stereotype Metal, Gas and Steam Fittings and Fixtures, Brass and Composition Castings.

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Veneer Nails, Label Tacks and small Nails of all kinds, Cabinet Nails, Barbed Lock Nails, Cigar Box Nails, &c., &c., put up in bulk, 5 lb. packages : 1 lb. papers, or as wanted.

AMERICAN WIRE NAIL CO.
 Factory, Fifteenth and Madison Sts.
 COVINGTON, KY.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

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OFFICE: 44a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY

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SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.

Special Correspondents.—The Ironmonger has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the Ironmonger. *The Week, Legal News, Trade Notes, Bankrupts, Foreign Notes, Colonial Jottings, Merchants' Circulars, Imports and Exports, &c.*, are each departments of the journal, containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

SUBSCRIPTIONS

To the Ironmonger and Metal Trades' Advertiser, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful Ironmongers' Diary and Text Book, a work sold to non-subscribers at 75 cents.

ADVERTISEMENTS

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13.15	14.10	15.00	16.90	18.75	22.50	26.25	
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7.00	7.50	8.00	9.00	10.00	12.00	14.00	
5.60	6.00	6.40	7.25	8.00	9.60	11.20	
3.95	4.25	4.50	5.10	5.65	6.75	7.75	
3.15	3.40	3.60	4.10	4.50	5.40	6.25	
1.75	1.90	2.00	2.25	2.50	3.00	3.50	

SPECIAL ISSUES.

In April and October of each year there is published a Special Issue, the circulation of which is not less than **Twelve Thousand (12,000) copies**.

THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual, presented free to every subscriber to the Ironmonger and Metal Trades' Advertiser. It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT

is published every fourth week in connection with the extensive and world-wide circulation of the Ironmonger itself. The dates of its publication in 1879 will be as follows:

JANUARY 11, FEBRUARY 8, MARCH 8, APRIL 5, MAY 3 and 31, JUNE 28, JULY 26, AUGUST 23, SEPTEMBER 20, OCTOBER 18, NOVEMBER 15, DECEMBER 13.

This Supplement is published in

FIVE LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the Ironmonger not only within reach in the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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22.00	24.75	27.50	22.50	8.45	9.40	
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Advertisers will do well to use Illustrations freely. Where economy of space is an object, a left page illustrated and described, in one language, can be suitably described in four or more languages on the opposite or right page without illustrating.

THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the Ironmonger and Foreign Supplement is a strikingly powerful and most efficient way of publicity, not to be compared with any of the other ordinary channels of communication.

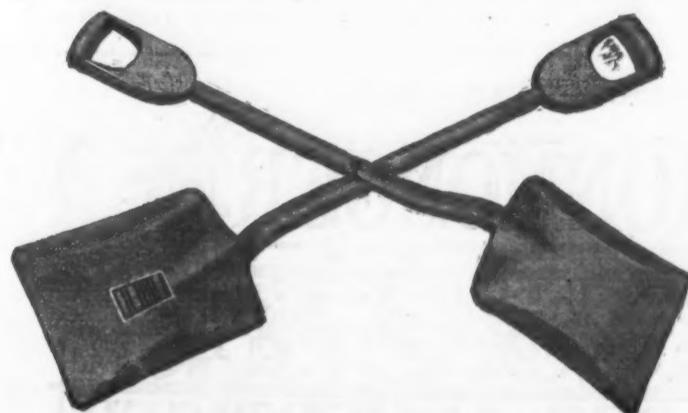


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The most complete assortment in the U. S. of
Shank, Socket Firmer and Socket Framing Chisels.
PLANE IRONS.

Gouges of all lengths and circles beveled inside or outside. Nail Sets, Scratch and Belt Awls
Chisel Handles of all kinds. Carving Tools. Also small Boxes of tools of best quality.

HUSSEY, BINNS & CO.,



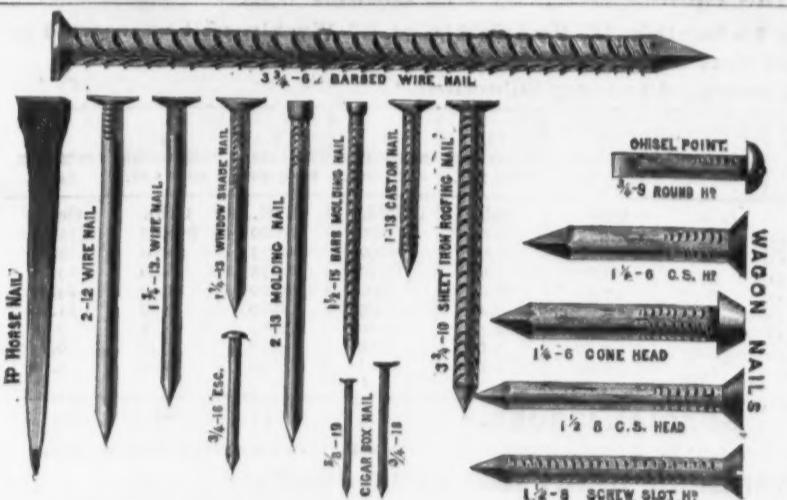
PITTSBURGH.

**SHOVELS,
SPADES and
SCOOPS.**



NEW sizes Patent Malleable Iron Oillers,
No. 2 and 3.
NEW pattern Heavy Screw Clamps;
strongest in the market.
Send for Price List.

Malleable Iron Castings
of superior quality, and Hardware Specialties in
Malleable Iron made to order.
HAMMER & CO., Branford, Conn.



HORSE SHOE & WIRE NAILS

Steel, Iron and Brass Nails and Barbed Nails

Of every kind.

Roofing and Moulding Nails, Escutcheon Pins, Chair and Caster Nails, Cigar
Box and Window Shade Nails, Wagon and Boat Nails.

Manufactured by

THE HP NAIL COMPANY,
Cleveland, Ohio.

NORTHWESTERN

HORSE NAIL CO.

ESTABLISHED IN 1863

Hammered & Finished Horse Nails.

We offer our Finished Nail to the trade with the confidence that it has no equal in the market. It is the genuine "Northwestern" Nail, Finished, and we give it our unqualified guarantee.

Office and Factory, 56 to 68 Van Buren St., Chicago.

A. W. KINGSLAND, Secretary.

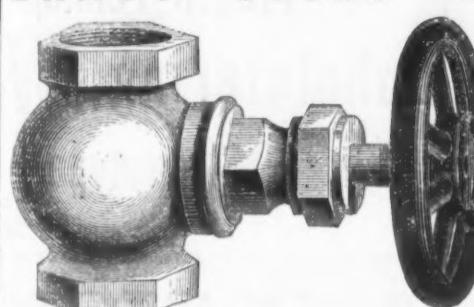
Our agents, Graham & Haines, 113 Chambers Street, New York, carry a full line of our goods, and will be pleased to serve you at Factory prices.

McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

BRASS COCKS AND VALVES,

For STEAM,
WATER
and GAS.



Iron Pipe and Fittings.
PLUMBERS' MATERIALS

New Illustrated Catalogue and Price
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56 John Street, N. Y.

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HAND FREEZER.
2 to 25 qts.
\$3.50 to \$25.00



HAND OR POWER
25 and 40 qts.
\$75.00 and \$87.50



HAND OF POWER
ICE CRUSHER.
\$37.50

SANDS' TRIPLE MOTION WHITE MOUNTAIN ICE CREAM FREEZER.

Galvanized Iron outside, tin inside. No secretions of oxide of zinc need be feared in the use of this Freezer. Simple in construction, perfect in results. Send for descriptive circular and discounts of this celebrated

WHITE MOUNTAIN FREEZER CO., Laconia, N. H.

COULTER, FLAGLER & CO.,

87 Chambers and 69 Reade Sts., New York,

**Hardware Manufacturers'
Warehouse.**



Office and Warehouse of Union Hardware Co., Russ Mfg. Co., Draw Knives, Chisels, &c.; Deuse Bros. Bits, Corkscrews, &c.; Richardson Bros. Saws of all kinds; Brooks Edge Tool Co.'s Axes, Hatchets, &c.; M. Price, Hatchets, &c.; J. & W. Rothery, Extra Hand Cut Files; L. D. Frost, Carriage Bolts, Refined and Norway Iron; Cowles Hardware Co., Screwdrivers, Mincing Knives, &c.; R. Wooster & Co., Anti-Friction Bars, Door Handles, Zinc Plates, Zinc Sheet, Zinc Wire, Zinc Dividers, Zinc Cutters, Zinc Scissors, Zinc Y. Anti-Friction Metal Co.'s Rabbit Metals; Howard, Razor Strips; C. Forchner, Spring Balances; P. Lowenthal & Co., Dividers, Calipers, &c.; Shepard Hardware Co., Flutes, Blind Hinges, &c.; Saxton & Ameson, Braces, all kinds; Bevin Bros. Mfg. Co., Belts, all kinds; H. H. Parsons & Bro., Plyers, Nippers, &c.; C. L. Griswold, Cast Steel Bits; Lancaster Lock Works, Jail Locks.

STANDARD NUT CO.,

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MANUFACTURERS OF

HOT PRESSED

Square & Hexagon Nuts,

R. R. FISH BARS,

BOLTS,

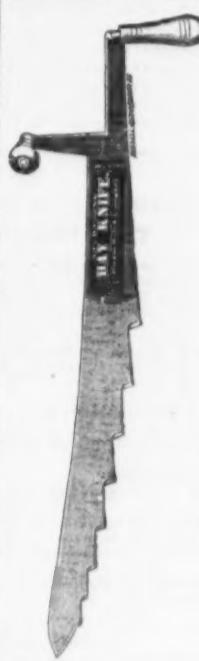
SPIKES,

RIVETS. &c.



LIGHTNING HAY KNIVES,

WEYMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each, of 50 lbs. weight, suitable for shipping by land or water to any part of the world.

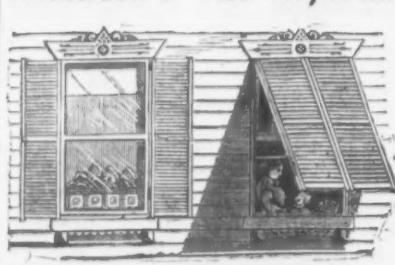
Manufactured only by

HIRAM HOLT & CO.,

East Wilton, Franklin Co., Maine.

For sale by the Hardware Trade generally.

Dearborn's Pat. Adjustable Blind Awning Fixtures.



Either old or new Blinds thus fitted can

be opened in the usual way or used as an

awning at pleasure.

For particulars address the sole manufacturers,

BOSTON BLOWER CO.,

Boston, Mass.

THE "OLD RELIABLE"
UNIVERSAL
Clothes Wringer.



Improved with Rowell's Double Cog-Wheels on both ends of each roll.

Over 500,000 sold!

And now in use, giving "Universal" satisfaction

EVERY WRINGER WARRANTED.

Be sure and inquire for the "Universal."

Sold by the Principal Jobbers in Hardware and House-Furnishing Goods everywhere.

Special rates given for export.

Metropolitan Washing Machine Co.

32 Cortlandt St., New York.

WM. S. CARR & CO.

Sole Manufacturers of

CARR'S

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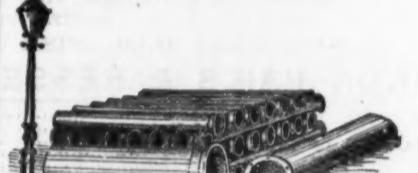
Water

Closets,

PUMPS, CABINET WOOD WORK, &c.

106, 108 & 110 Centre Street,

Factory, Mott Haven, NEW YORK.



R. D. WOOD & CO.

Philadelphia,

Manufacturers of

Cast Iron Pipe

FOR WATER AND GAS.

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.



MACHINISTS' TOOLS,

BEST AND CHEAPEST.

Send for catalogue to

WILLIAM COOKE,

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FARLEY'S PATENT

Rubber-Cushioned Casting Brush.

Superior to any in the Market.



Manufactured and for sale in the

L. B. FLANDERS MACHINE WORKS,

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Descriptive Circular on application.

VERMONT SNATH CO.,

Manufacturers of

Pat. Swing Socket Snaths

and also a large variety of other styles of Snaths.

Springfield, Vermont.

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(Corrected weekly by Lloyd, Supply & Walton.)

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.

Peter Wright's, W. B. gold.....

over 20 lbs.....

Winkinson's, W. B. gold.....

Eagle (American).....

9 cents per lb.—dis 20%.

Axes, Hammers.

Reinhard No. 1.....

per doz \$ 5.00 net

" 75.....

" 75.....

Peace Hammer, cover and slicer.....

10.00 net

Litte Farter, cover and slicer.....

15.00 net

Lots of 10 to 25 dozen special price.

Axes, Hammers.

M. & J. Red Warmer.....

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Crown Prince.....

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Auger, Augers.

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Bonington Prince Auger Bits.....

Grimes' Auger Bits.....

Cook's.....

Jennings'.....

Bonington Pat. Hol. Augers, list \$ 5.00 per doz.....

Stearns' Pat. Hol. Augers.....

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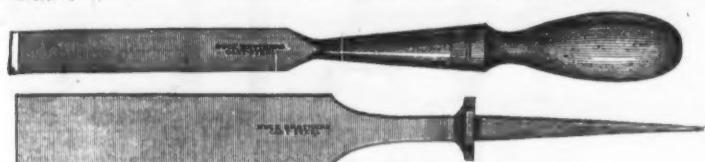
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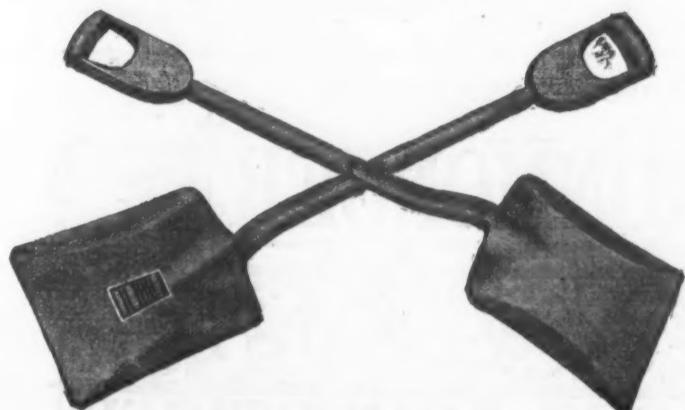


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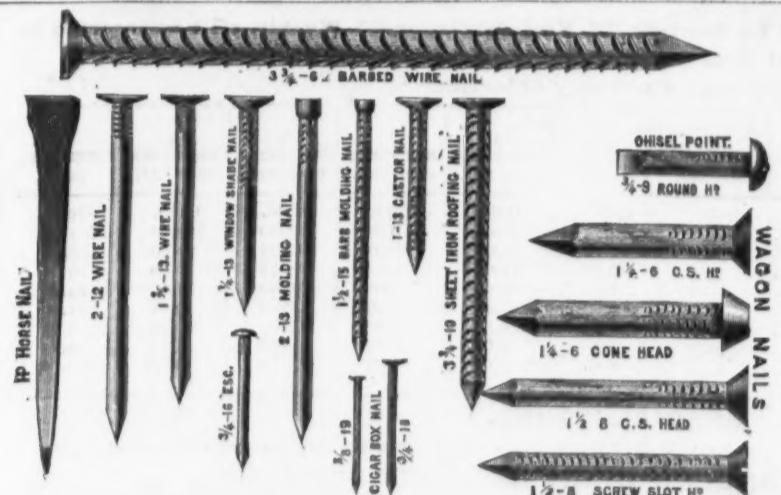
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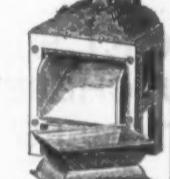
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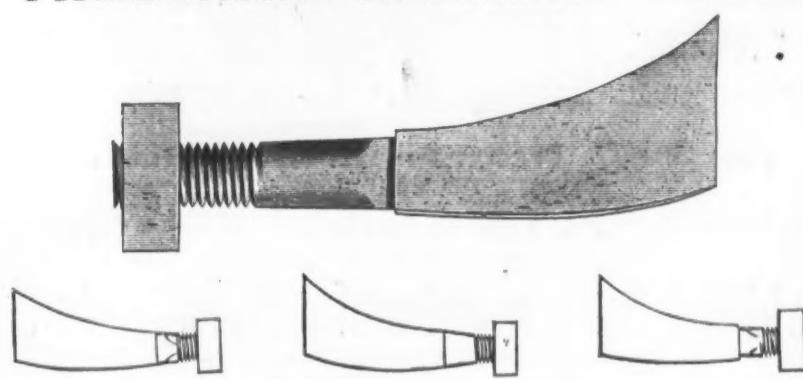
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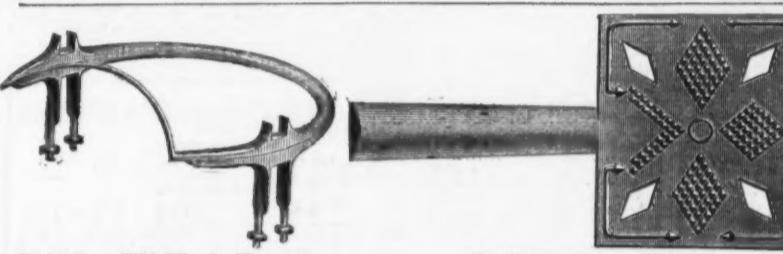
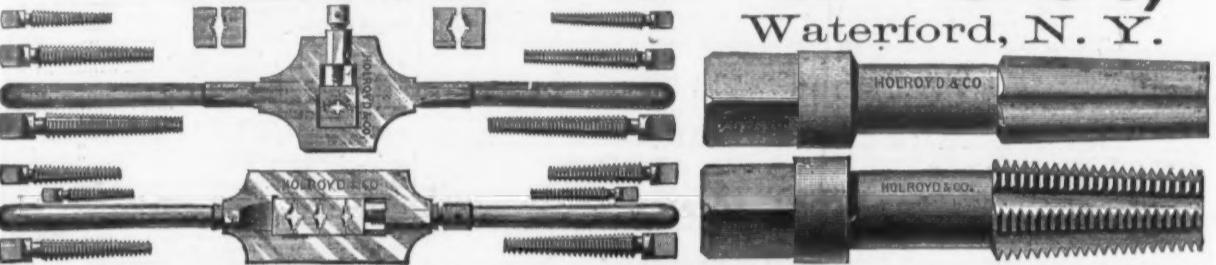
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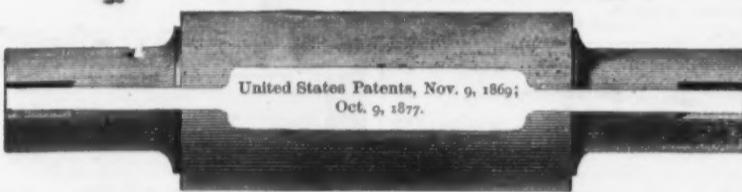
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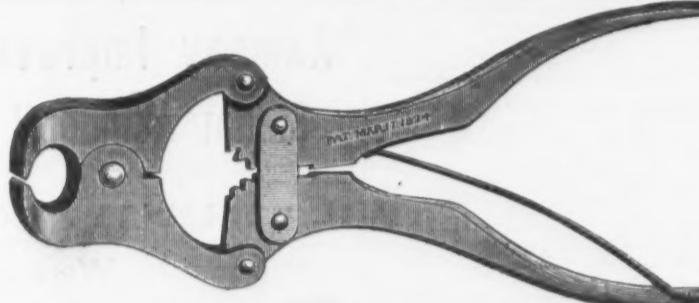
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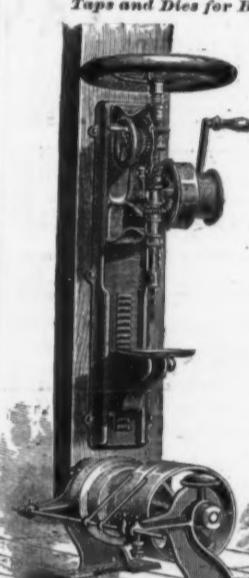
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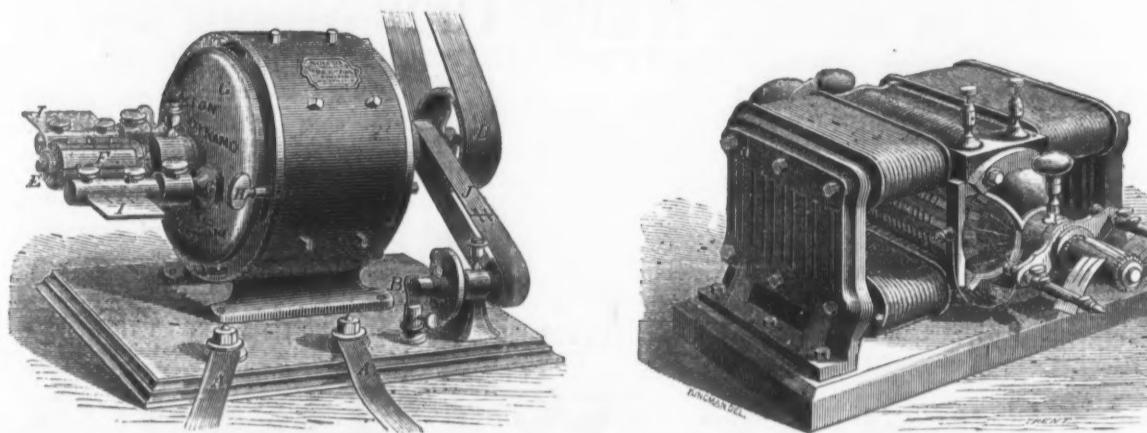
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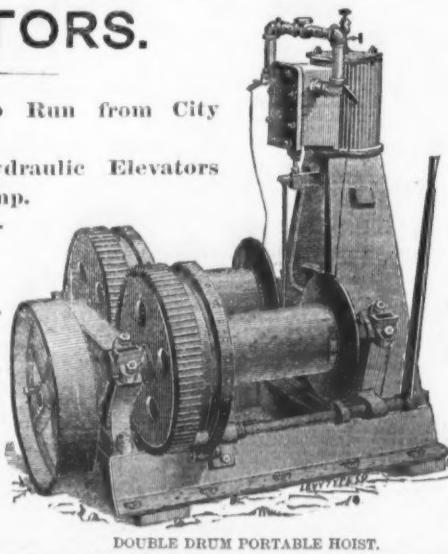
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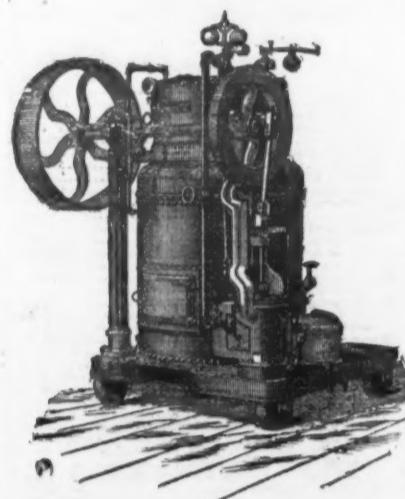
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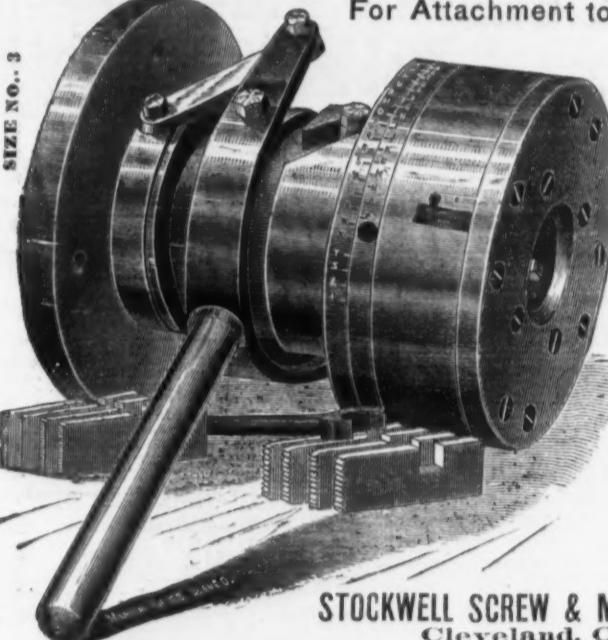
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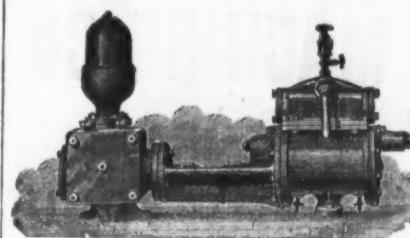
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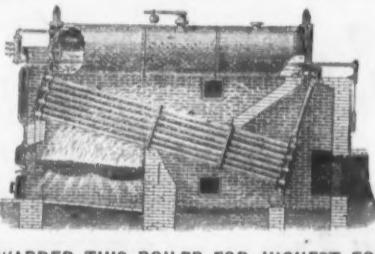
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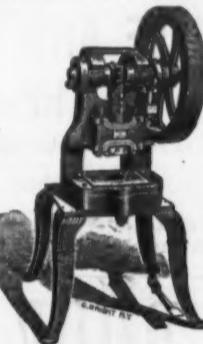
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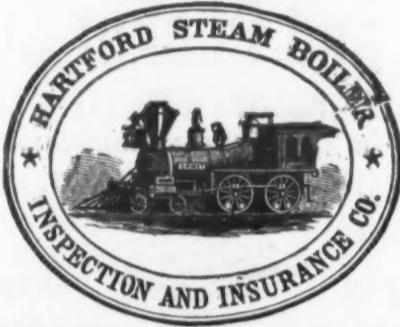
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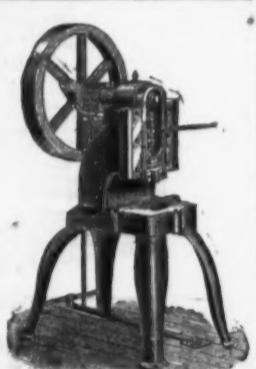
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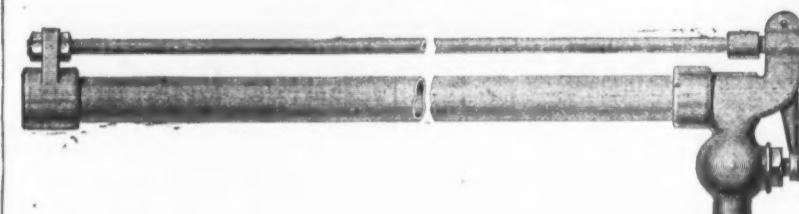
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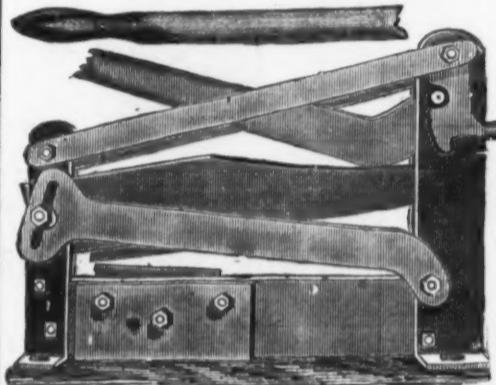
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